

Connecting via Winsock to STN

Welcome to STN International! Enter x:x

LOGINID:ssptamjl1745

PASSWORD:

TERMINAL (ENTER 1, 2, 3, OR ?):2

\* \* \* \* \* Welcome to STN International \* \* \* \* \*

NEWS	1		Web Page for STN Seminar Schedule - N. America
NEWS	2	JUL 28	CA/CAPLUS patent coverage enhanced
NEWS	3	JUL 28	EPFULL enhanced with additional legal status information from the epline Register
NEWS	4	JUL 28	IFICDB, IFIPAT, and IFIUDB reloaded with enhancements
NEWS	5	JUL 28	STN Viewer performance improved
NEWS	6	AUG 01	INPADOCDB and INPAFAMDB coverage enhanced
NEWS	7	AUG 13	CA/CAPLUS enhanced with printed Chemical Abstracts page images from 1967-1998
NEWS	8	AUG 15	CAOLD to be discontinued on December 31, 2008
NEWS	9	AUG 15	CAPLUS currency for Korean patents enhanced
NEWS	10	AUG 27	CAS definition of basic patents expanded to ensure comprehensive access to substance and sequence information
NEWS	11	SEP 18	Support for STN Express, Versions 6.01 and earlier, to be discontinued
NEWS	12	SEP 25	CA/CAPLUS current-awareness alert options enhanced to accommodate supplemental CAS indexing of exemplified prophetic substances
NEWS	13	SEP 26	WPIDS, WPINDEX, and WPIX coverage of Chinese and Korean patents enhanced
NEWS	14	SEP 29	IFICLS enhanced with new super search field
NEWS	15	SEP 29	EMBASE and EMBAL enhanced with new search and display fields
NEWS	16	SEP 30	CAS patent coverage enhanced to include exemplified prophetic substances identified in new Japanese-language patents
NEWS	17	OCT 07	EPFULL enhanced with full implementation of EPC2000
NEWS	18	OCT 07	Multiple databases enhanced for more flexible patent number searching
NEWS	19	OCT 22	Current-awareness alert (SDI) setup and editing enhanced
NEWS	20	OCT 22	WPIDS, WPINDEX, and WPIX enhanced with Canadian PCT Applications
NEWS	21	OCT 24	CHEMLIST enhanced with intermediate list of pre-registered REACH substances
NEWS EXPRESS		JUNE 27 08	CURRENT WINDOWS VERSION IS V8.3, AND CURRENT DISCOVER FILE IS DATED 23 JUNE 2008.
NEWS HOURS			STN Operating Hours Plus Help Desk Availability
NEWS LOGIN			Welcome Banner and News Items
NEWS IPC8			For general information regarding STN implementation of IPC 8

Enter NEWS followed by the item number or name to see news on that specific topic.

All use of STN is subject to the provisions of the STN Customer agreement. Please note that this agreement limits use to scientific research. Use for software development or design or implementation of commercial gateways or other similar uses is prohibited and may result in loss of user privileges and other penalties.

\* \* \* \* \* STN Columbus \* \* \* \* \*

FILE 'HOME' ENTERED AT 17:59:07 ON 03 NOV 2008

=> file reg

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	0.21	0.21

FILE 'REGISTRY' ENTERED AT 17:59:37 ON 03 NOV 2008

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2008 American Chemical Society (ACS)

Property values tagged with IC are from the ZIC/VINITI data file provided by InfoChem.

STRUCTURE FILE UPDATES: 2 NOV 2008 HIGHEST RN 1070028-20-4

DICTIONARY FILE UPDATES: 2 NOV 2008 HIGHEST RN 1070028-20-4

New CAS Information Use Policies, enter HELP USAGETERMS for details.

TSCA INFORMATION NOW CURRENT THROUGH July 5, 2008.

Please note that search-term pricing does apply when conducting SmartSELECT searches.

REGISTRY includes numerically searchable data for experimental and predicted properties as well as tags indicating availability of experimental property data in the original document. For information on property searching in REGISTRY, refer to:

<http://www.cas.org/support/stngen/stdoc/properties.html>

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or 0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/cr and (0.25-0.75)/mn and 3/o

83248 0.01-1/LA  
67711 0.01-1/Y  
50999 0.01-1/CE  
35784 0.01-1/PR  
65858 0.01-1/ND  
40622 0.01-1/GD  
19510 0.01-1/YB  
78659 0.01-1/SR  
103829 0.01-1/CA  
92527 0.01-1/BA  
6029 (0.25-0.75)/CR  
11256 (0.25-0.75)/MN  
6667494 3/O

```

L1      136 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
          OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1
          /BA) AND (0.25-0.75)/CR AND (0.25-0.75)/MN AND 3/O

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or
0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/cr and (0.25-
0.75)/mg and 3/o
      83248 0.01-1/LA
      67711 0.01-1/Y
      50999 0.01-1/CE
      35784 0.01-1/PR
      65858 0.01-1/ND
      40622 0.01-1/GD
      19510 0.01-1/YB
      78659 0.01-1/SR
      103829 0.01-1/CA
      92527 0.01-1/BA
      6029 (0.25-0.75)/CR
      11614 (0.25-0.75)/MG
      6667494 3/O

L2      18 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
          OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1
          /BA) AND (0.25-0.75)/CR AND (0.25-0.75)/MG AND 3/O

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or
0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/cr and (0.25-
0.75)/fe and 3/o
      83248 0.01-1/LA
      67711 0.01-1/Y
      50999 0.01-1/CE
      35784 0.01-1/PR
      65858 0.01-1/ND
      40622 0.01-1/GD
      19510 0.01-1/YB
      78659 0.01-1/SR
      103829 0.01-1/CA
      92527 0.01-1/BA
      6029 (0.25-0.75)/CR
      12100 (0.25-0.75)/FE
      6667494 3/O

L3      44 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
          OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1
          /BA) AND (0.25-0.75)/CR AND (0.25-0.75)/FE AND 3/O

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or
0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/mn and (0.25-
0.75)/mg and 3/o
      83248 0.01-1/LA
      67711 0.01-1/Y
      50999 0.01-1/CE
      35784 0.01-1/PR
      65858 0.01-1/ND
      40622 0.01-1/GD
      19510 0.01-1/YB
      78659 0.01-1/SR
      103829 0.01-1/CA
      92527 0.01-1/BA
      11256 (0.25-0.75)/MN
      11614 (0.25-0.75)/MG
      6667494 3/O

```

L4           7 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
               OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1  
               /BA) AND (0.25-0.75)/MN AND (0.25-0.75)/MG AND 3/O

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or  
 0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/mn and (0.25-  
 0.75)/fe and 3/o

83248 0.01-1/LA  
 67711 0.01-1/Y  
 50999 0.01-1/CE  
 35784 0.01-1/PR  
 65858 0.01-1/ND  
 40622 0.01-1/GD  
 19510 0.01-1/YB  
 78659 0.01-1/SR  
 103829 0.01-1/CA  
 92527 0.01-1/BA  
 11256 (0.25-0.75)/MN  
 12100 (0.25-0.75)/FE  
 6667494 3/O

L5           95 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
               OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1  
               /BA) AND (0.25-0.75)/MN AND (0.25-0.75)/FE AND 3/O

=> s (0.01-1/La or 0.01-1/Y or 0.01-1/Ce or 0.01-1/Pr or 0.01-1/Nd or 0.01-1/Gd or  
 0.01-1/yb) and (0.01-1/sr or 0.01-1/ca or 0.01-1/ba) and (0.25-0.75)/fe and (0.25-  
 0.75)/mg and 3/o

83248 0.01-1/LA  
 67711 0.01-1/Y  
 50999 0.01-1/CE  
 35784 0.01-1/PR  
 65858 0.01-1/ND  
 40622 0.01-1/GD  
 19510 0.01-1/YB  
 78659 0.01-1/SR  
 103829 0.01-1/CA  
 92527 0.01-1/BA  
 12100 (0.25-0.75)/FE  
 11614 (0.25-0.75)/MG  
 6667494 3/O

L6           4 (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
               OR 0.01-1/GD OR 0.01-1/YB) AND (0.01-1/SR OR 0.01-1/CA OR 0.01-1  
               /BA) AND (0.25-0.75)/FE AND (0.25-0.75)/MG AND 3/O

=> file caplus

COST IN U.S. DOLLARS	SINCE FILE	TOTAL
	ENTRY	SESSION
FULL ESTIMATED COST	404.00	404.21

FILE 'CAPLUS' ENTERED AT 18:02:50 ON 03 NOV 2008  
 USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
 COPYRIGHT (C) 2008 AMERICAN CHEMICAL SOCIETY (ACS)

Copyright of the articles to which records in this database refer is  
 held by the publishers listed in the PUBLISHER (PB) field (available  
 for records published or updated in Chemical Abstracts after December  
 26, 1996), unless otherwise indicated in the original publications.  
 The CA Lexicon is the copyrighted intellectual property of the

American Chemical Society and is provided to assist you in searching databases on STN. Any dissemination, distribution, copying, or storing of this information, without the prior written consent of CAS, is strictly prohibited.

FILE COVERS 1907 - 3 Nov 2008 VOL 149 ISS 19  
FILE LAST UPDATED: 2 Nov 2008 (20081102/ED)

Caplus now includes complete International Patent Classification (IPC) reclassification data for the second quarter of 2008.

Effective October 17, 2005, revised CAS Information Use Policies apply. They are available for your review at:

<http://www.cas.org/legal/infopolicy.html>

=> d his

(FILE 'HOME' ENTERED AT 17:59:07 ON 03 NOV 2008)

FILE 'REGISTRY' ENTERED AT 17:59:37 ON 03 NOV 2008

L1	136	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
L2	18	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
L3	44	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
L4	7	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
L5	95	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND
L6	4	S	(0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND

FILE 'CAPLUS' ENTERED AT 18:02:50 ON 03 NOV 2008

=> s 11

L7 134 L1

=> s 15

L8 102 L5

=> s (17 or 18) and (solid oxide fuel cell)

1164465 SOLID

300395 SOLIDS

1384785 SOLID

(SOLID OR SOLIDS)

1920018 OXIDE

367584 OXIDES

2023829 OXIDE

(OXIDE OR OXIDES)

450392 FUEL

178017 FUELS

505187 FUEL

(FUEL OR FUELS)

2476364 CELL

2132000 CELLS

3234173 CELL

(CELL OR CELLS)

9816 SOLID OXIDE FUEL CELL

(SOLID(W)OXIDE(W)FUEL(W)CELL)

L9 56 (L7 OR L8) AND (SOLID OXIDE FUEL CELL)

=> s 12

L10 6 L2



INVENTOR(S): Han, Minfang  
 PATENT ASSIGNEE(S): China University of Mining & Technology (Beijing),  
 Peop. Rep. China  
 SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 14pp.  
 CODEN: CNXXEV  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Chinese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 101246980	A	20080820	CN 2008-10102774	20080326
PRIORITY APPLN. INFO.:			CN 2008-10102774	20080326

AB The title power generation system comprises several solid oxide fuel cell (SOFC) modules and thermoelec. battery modules, which are arranged alternately. The thermoelec. battery modules comprise thermoelec. material including Bi<sub>2</sub>Te<sub>3</sub>-based solid solution and AgSbTe<sub>2</sub>-GeTe-based solid solution. Each thermoelec. battery module is composed of two groups of thermoelec. batteries. Each thermoelec. battery module has a hot end connected with a SOFC module, and a cold end connected with a circuit system through a current collector plate. The power generation system has simple structure, low cost, and high heat utilization rate.

L9 ANSWER 2 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2008:817819 CAPLUS Full-text

DOCUMENT NUMBER: 149:311173

TITLE: Pd-Promoted La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3</sub>/YSZ Composite Anodes for Direct Utilization of Methane in SOFCs

AUTHOR(S): Ye, Yinmei; He, Tianmin; Li, Yibin; Tang, Ee Ho; Reitz, Thomas L.; Jiang, San Ping

CORPORATE SOURCE: School of Mechanical and Aerospace Engineering, Nanyang Technological University, 639798, Singapore

SOURCE: Journal of the Electrochemical Society (2008), 155(8), B811-B818

CODEN: JESOAN; ISSN: 0013-4651

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Palladium-impregnated La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3</sub>- $\delta$ /yttria-stabilized zirconia (LSCM/YSZ) composite anode is investigated for the direct utilization of methane in solid oxide fuel cells (SOFCs). Impregnation of Pd nanoparticles significantly promotes the electrocatalytic activity of LSCM/YSZ composite anodes for the methane electrooxidn. reaction in wet CH<sub>4</sub>. At 800°, the electrode polarization resistance for the methane oxidation is reduced by a factor of 3 after impregnation of 0.10-0.66 mg/cm<sup>2</sup> Pd. Pd impregnation primarily enhances the electrode processes at low frequencies, indicating the significant promotion effect on the oxygen transfer process and the CH<sub>4</sub> decomposition for the reaction on the LSCM/YSZ composite anodes. No carbon deposition was observed for the reaction in wet CH<sub>4</sub> on Pd-impregnated LSCM/YSZ composite anodes. In contrast, Pd impregnation has little effect on the hydrogen oxidation in wet H<sub>2</sub>. The results demonstrate that the Pd-impregnated LSCM/YSZ composite is a promising carbon-tolerant anode for natural gas fuel-based SOFCs.

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2008:639123 CAPLUS Full-text

DOCUMENT NUMBER: 149:13733  
 TITLE: Thin solid oxide cell  
 INVENTOR(S): Larsen, Peter Halvor; Linderroth, Soren; Hendriksen, Peter Vang  
 PATENT ASSIGNEE(S): Technical University of Denmark, Den.  
 SOURCE: PCT Int. Appl., 36pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	-----
WO 2008061782	A2	20080529	WO 2007-EP10194	20071123
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
EP 1928049	A1	20080604	EP 2006-24338	20061123
R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, AL, BA, HR, MK, RS				

PRIORITY APPLN. INFO.: EP 2006-24338 A 20061123

AB This unsupported solid oxide cell consists of a porous anode layer, an electrolyte layer and a porous cathode layer, wherein the anode and the cathode layers comprise an electrolyte material, at least one metal and a catalyst, and wherein the overall thickness of the reversible cell is .apprx.150 µm or less. The electrolyte material is doped zirconia - a method for producing this type of cell is also presented. The cell has a thin separation membrane, comprising at least a porous anode layer, a membrane layer comprising a mixed conducting material and a porous cathode layer, wherein the anode and cathode layers comprise the mixed conducting material and a catalyst material, and wherein the overall thickness of the thin separation membrane is .apprx.1050 µm or less.

L9 ANSWER 4 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2008:531926 CAPLUS Full-text  
 DOCUMENT NUMBER: 148:565092  
 TITLE: Synthesis and electrical characterization of the ceramic anode La<sub>1-x</sub>Sr<sub>x</sub>Mn<sub>0.5</sub>Cr<sub>0.5</sub>O<sub>3</sub>  
 AUTHOR(S): Fonseca, F. C.; Muccillo, E. N. S.; Muccillo, R.; de Florio, D. Z.  
 CORPORATE SOURCE: Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo, 05508-000, Brazil  
 SOURCE: Journal of the Electrochemical Society (2008), 155(5), B483-B487  
 CODEN: JESOAN; ISSN: 0013-4651  
 PUBLISHER: Electrochemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English



AB The synthesis and elec. characterization of  $\text{La}_{1-x}\text{Sr}_x\text{Mn}_{0.5}\text{Cr}_{0.5}\text{O}_3$  compds. are reported. These compds., with perovskite structure, have been pointed out as a promising alternative for the nickel-based cermet anode of solid oxide fuel cells. Polycryst. samples, with  $x = 0.3, 0.4$ , and  $0.5$ , were prepared by the citrate technique. The crystalline phase and the chemical compatibility with zirconia-based electrolytes were studied by x-ray diffraction analyses. The elec. properties were studied by four-probe d.c. elec. conductivity  $\sigma(T)$  measurements during redox cycles under both oxidizing and reducing atmospheres. The main results show that the  $\sigma(T)$  has a thermally activated behavior, and increasing Sr content increases  $\sigma(T)$ . Compds. with  $x = 0.3$  exhibited no appreciable chemical reaction with the stabilized zirconia electrolyte after heat-treatment at high temperature. The  $\sigma(T)$  measurements evidenced the redox stability of the ceramic anode. However, some degradation of the  $\sigma(T)$  was observed on samples thermally treated at  $1000^\circ$  under pure hydrogen.

REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2008:515569 CAPLUS Full-text  
DOCUMENT NUMBER: 148:565303  
TITLE: Lanthanum chromium oxide based composite connecting material for solid oxide fuel cell and its manufacture  
INVENTOR(S): Liu, Xingqin; Zhou, Xiaoliang; Meng, Guangyao  
PATENT ASSIGNEE(S): University of Science & Technology of China, Peop. Rep. China  
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 11pp.  
CODEN: CNXXEV  
DOCUMENT TYPE: Patent  
LANGUAGE: Chinese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
CN 101165951	A	20080423	CN 2006-10096904	20061018
PRIORITY APPLN. INFO.:			CN 2006-10096904	20061018

AB The title material comprises  $\text{LaCrO}_3$ -based connecting material 90-99.5% and  $\text{CeO}_2$ -based electrolyte material 0.5-10%; and is manufactured by (1) preparing the  $\text{LaCrO}_3$ -based connecting material at  $1,000$ - $1,200^\circ$  and a  $\text{CeO}_2$  powder at  $650$ - $800^\circ$ , (2) mixing the two materials at the required weight ratio, and drying for 4-6 h, (3) grinding in a mortar for 3-5 h, and (4) press-molding under a pressure of 100-600 MPa. The obtained connecting material has the advantages of high elec. conductivity and good sintering activity, and cannot initiate thermal stress in the use of cell stack, so as to improve the structure stability and service life of stacks.

L9 ANSWER 6 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2008:439361 CAPLUS Full-text  
DOCUMENT NUMBER: 149:13355  
TITLE: The rate and selectivity of methane oxidation over  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_x\text{Mn}_{1-x}\text{O}_{3-\delta}$  as a function of lattice oxygen stoichiometry under solid oxide fuel cell anode conditions  
AUTHOR(S): van den Bossche, Michael; McIntosh, Steven  
CORPORATE SOURCE: Department of Chemical Engineering, University of

SOURCE: Virginia, Charlottesville, VA, 22904-4741, USA  
Journal of Catalysis (2008), 255(2), 313-323  
CODEN: JCTLA5; ISSN: 0021-9517  
PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Perovskite-structured  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_x\text{Mn}_{1-x}\text{O}_{3-\delta}$  (LSCM,  $x = 0, 0.25, 0.50, 0.75$ , and  $1$ ) is a potential anode material for direct hydrocarbon solid oxide fuel cells (SOFCs). A pulse reactor system was used to determine the catalytic activity and selectivity of LSCM toward methane total oxidation between  $700$  and  $900^\circ$  in the absence of gas-phase  $\text{O}_2$ . This replicates a SOFC anode environment in which oxidation occurs through reduction of the oxide lattice. Activity and selectivity were characterized as a function of lattice  $\text{O}$  stoichiometry,  $3 - \delta$ . As  $3 - \delta$  decreased, the selectivity toward total oxidation decreased for all compns. due to either a change toward partial oxidation or increased dry-reforming activity. The reaction rate and range of  $\text{O}$  stoichiometry favoring total oxidation increased with increasing Mn content. This was accompanied by a decrease in both C formation and oxide stability. These measurements suggest that more-active catalysts are required for SOFC applications.

REFERENCE COUNT: 48 THERE ARE 48 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 7 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:1368993 CAPLUS [Full-text](#)

DOCUMENT NUMBER: 148:499274

TITLE: Anode supported LSCM-LSGM-LSM solid oxide fuel cell

AUTHOR(S): Mohammadi, Alidad; Sammes, Nigel M.; Pusz, Jakub; Smirnova, Alevtina L.

CORPORATE SOURCE: Department of Materials Science and Engineering, University of Connecticut, Storrs, CT, 06269, USA

SOURCE: Ceramic Engineering and Science Proceedings (2007), 27(4, Advances in Solid Oxide Fuel Cells II), 27-34  
CODEN: CESPDK; ISSN: 0196-6219

PUBLISHER: John Wiley & Sons, Inc.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB This paper describes an intermediate temperature solid oxide fuel cell (ITSOFC), based on porous  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_3$  (LSCM) anode,  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_{2.8}$  (LSGM) electrolyte, and porous  $\text{La}_{0.6}\text{Sr}_{0.4}\text{MnO}_3$  (LSM) cathode. Using different amts. of pore-formers, binders and firing temps., the porosity of the anode was optimized while still retaining good mech. integrity. The effect of cell operation condition under saturated H fuel on the SOFC open circuit voltage (OCV) was also studied. 20 mL/min flow rate of saturated H results in an initial OCV up to .apprx.1.0V for a single cell. The cell was tested for >500 h maintaining high values of OCV (0.9 V). Increasing the H flow rate up to 200 mL/min, results in enhanced OCV values up to 0.99 V.

L9 ANSWER 8 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:1174468 CAPLUS [Full-text](#)

DOCUMENT NUMBER: 148:541647

TITLE: Preparation and performance of novel anode material  $\text{La}_{0.7}\text{Sr}_{0.3}\text{Cr}_{0.5-y}\text{Mn}_{0.5-z}\text{Co}_{(y+z)}\text{O}_3$  perovskite for solid oxide fuel cell

AUTHOR(S): He, Enquan; Na, Wenhui; Liu, Ronghui; Yu, Jie; Dai, Yongnian

CORPORATE SOURCE: Faculty of Materials and Metallurgical Engineering,  
Kunming University of Science and Technology, Kunming,  
650093, Peop. Rep. China

SOURCE: Xiyou Jinshu (2007), 31(4), 497-500  
CODEN: XIJID9; ISSN: 0258-7076

PUBLISHER: Xiyou Jinshu Bianjibu

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB The anode materials  $\text{La}_{0.7}\text{Sr}_{0.3}\text{Cr}_{0.5-y}\text{Mn}_{0.5-z}\text{Co}_{(y+z)}\text{O}_3$  (LSCMCo) ( $y, z = 0.1, 0.2$ ) were synthesized by glycine-nitrate process (GNP). The microstructure and phases of LSCMCo were tested by X-ray diffraction (XRD) and SEM. XRD patterns indicated that single perovskite phase was obtained by GNP after sintering at 1,350°C for 5 h. SEM images showed that the material was almost submitted globosity and did not show any aggregation with the diameter of 1  $\mu\text{m}$ . The elec. conductivity of different materials in the range of 250.apprx.;800°C was tested by means of direct fourelectrode method. The results showed that the conductivity increased with the temperature, corresponding to the small polaron principle. On the other hand,  $\text{La}_{0.7}\text{Sr}_{0.3}\text{Cr}_{0.5}\text{Mn}_{0.4}\text{Co}_{0.1}\text{O}_3$  exhibited good chemical compatibility with the electrolyte material  $\text{La}_{0.9}\text{Sr}_{0.1}\text{Ga}_{0.8}\text{Mg}_{0.2}\text{O}_3$ . Meanwhile, the conductivity of  $\text{La}_{0.7}\text{Sr}_{0.3}\text{Cr}_{0.5}\text{Mn}_{0.4}\text{Co}_{0.1}\text{O}_3$  at different atmospheric was researched, in consequence, the maximum values were 4.5 S/cm in methane and 0.42 S/cm in hydrogen, resp.

L9 ANSWER 9 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:852697 CAPLUS Full-text

DOCUMENT NUMBER: 147:409550

TITLE: Improvement of the electrochemical properties of novel  
solid oxide fuel  
cell anodes,  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$   
and  $\text{La}_{4}\text{Sr}_{8}\text{Ti}_{11}\text{Mn}_{0.5}\text{Ga}_{0.5}\text{O}_{37.5-\delta}$ , using  
Cu-YSZ-based cermets

AUTHOR(S): Ruiz-Morales, J. C.; Canales-Vazquez, J.;  
Marrero-Lopez, D.; Irvine, J. T. S.; Nunez, P.

CORPORATE SOURCE: Departamento de Quimica Inorganica, Universidad de La  
Laguna, La Laguna, Tenerife, 38200, Spain

SOURCE: Electrochimica Acta (2007), 52(25), 7217-7225  
CODEN: ELCAAV; ISSN: 0013-4686

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A Cu-based cermet was used to improve the electrochem. properties of the 2 novel oxide systems with intrinsic low electronic conductivity,  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$  (LSCM) and  $\text{La}_{4}\text{Sr}_{8}\text{Ti}_{11}\text{Mn}_{0.5}\text{Ga}_{0.5}\text{O}_{37.5-\delta}$  (LSTMG). The introduction of Cu improves the polarization resistance and hence the performance. The best results correspond to the addition of .apprx.15% CuO. In both systems, the polarization resistances improved by a least a factor of 2. Some reports claim that the CuO-zirconia-based systems exhibit catalytic activity, but this improvement is related to the capability of CuO as a sintering agent, helping to bridge electrode particles, creating new electronic paths and thus effectively increasing the triple phase boundary through the electrode material.

REFERENCE COUNT: 46 THERE ARE 46 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 10 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:688847 CAPLUS Full-text

DOCUMENT NUMBER: 147:304072

TITLE: Synthesis and Performance of  
(La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>1-x</sub>(Cr<sub>0.5</sub>Mn<sub>0.5</sub>)O<sub>3</sub> Cathode Powders of  
Solid Oxide Fuel  
Cells by Gel-Casting Technique

AUTHOR(S): Zhang, Lan; Jiang, San Ping; Cheng, Chia Siang; Zhang,  
Yujun

CORPORATE SOURCE: School of Mechanical and Aerospace Engineering,  
Nanyang Technological University, 639798, Singapore

SOURCE: Journal of the Electrochemical Society (2007), 154(6),  
B577-B582  
CODEN: JESOAN; ISSN: 0013-4651

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The synthesis and performance of (La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>1-x</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3</sub> (x =  
0.0,0.1,0.2) (LSCM) cathode powders of solid oxide fuel cells by gel-casting  
and solid-state reaction methods were studied. DTA and x-ray diffraction  
anal. indicate that the phase formation temperature of LSCM powders  
synthesized by the gel-casting technique is 50-100° lower than that by the  
solid-state reaction method. The reason is related to the homogeneously  
distributed and immobilized precursor particles in a polymeric network,  
achieved during the crosslinking and gel formation steps. The LSCM cathode  
prepared by the gel-casting powder has a much higher electrochem. activity for  
the O<sub>2</sub> reduction than that by the solid-state reaction powder. However,  
significant A-site nonstoichiometry (0.1 or higher) should be avoided to  
prevent the formation of a secondary (MnCr<sub>2</sub>)O<sub>4</sub> spinel phase.

REFERENCE COUNT: 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 11 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:679278 CAPLUS Full-text

DOCUMENT NUMBER: 149:132164

TITLE: Synthesis and electrical characterization of the  
ceramic anode La<sub>1-x</sub>Sr<sub>x</sub>Mn<sub>0.5</sub>Cr<sub>0.5</sub>O<sub>3</sub>

AUTHOR(S): Fonseca, F. C.; de Florio, D. Z.; Muccillo, E. N. S.;  
Muccillo, R.

CORPORATE SOURCE: Instituto de Pesquisas Energeticas e Nucleares, Sao  
Paulo, Brazil

SOURCE: ECS Transactions (2007), 7(1, Solid Oxide Fuel Cells  
10 (SOFC-X), Part 2), 1623-1630  
CODEN: ECSTF8

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The synthesis and elec. characterization of La<sub>1-x</sub>Sr<sub>x</sub>Mn<sub>0.5</sub>Cr<sub>0.5</sub>O<sub>3</sub> compds. are  
reported. Such a perovskite has been pointed out as a promising alternative  
for the nickel-based cermet anode. Polycryst. samples, with x = 0.3, 0.4, and  
0.5, have been prepared by the citrate technique. The crystalline phase and  
the chemical compatibility with zirconia-based electrolytes were studied by x-  
ray diffraction analyses. The elec. properties were studied by 4-probe d.c.  
elec. conductivity  $\sigma(T)$  measurements under both oxidizing and reducing  
atmospheric The main results show that the  $\sigma(T)$  has a thermally activated  
behavior, and increasing Sr content increases  $\sigma(T)$ . Compds. with x = 0.3  
exhibited no appreciable chemical reaction with the zirconia electrolyte after  
heat treatment at high temperature The  $\sigma(T)$  measurements indicated the redox  
stability of the ceramic anode. However, some degradation of the  $\sigma(T)$  was  
observed on thermally treated samples in fuel conditions.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 12 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:661435 CAPLUS Full-text

DOCUMENT NUMBER: 147:146928

TITLE: Lanthanum strontium manganese chromite cathode and anode synthesized by gel-casting for solid oxide fuel cells

AUTHOR(S): Jiang, San Ping; Zhang, Lan; Zhang, Yujun

CORPORATE SOURCE: School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, 639798, Singapore

SOURCE: Journal of Materials Chemistry (2007), 17(25), 2627-2635

CODEN: JMACEP; ISSN: 0959-9428

PUBLISHER: Royal Society of Chemistry

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Lanthanum strontium manganese chromite,  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_3$  (LSCM), perovskite oxides were synthesized by gel-casting and solid-state reaction techniques as electrode materials of solid oxide fuel cells. Thermal and x-ray diffraction analyses indicate that the phase formation temperature of LSCM powders synthesized by the gel-casting technique is 50-100° lower than that by the solid-state reaction method. The LSCM/YSZ (yttria-stabilized zirconia) composite electrode prepared using the gel-casting LSCM powder is shown to have a much higher electrochem. activity for the  $\text{O}_2$  reduction and  $\text{H}_2$  oxidation reactions than that using the solid-state reaction powder. The reason for this is most likely related to the homogeneously distributed and immobilized precursor particles in a polymeric network, forming micro-scale interconnected networks. The results in the present study demonstrate the advantages of the aqueous gel-casting method in the synthesis of high quality and highly catalytic active LSCM oxide powders for solid oxide fuel cells. Finally, a novel sym. LSCM/YSZ composite anode and LSCM/YSZ composite cathode-supported thin-electrolyte cell is fabricated and demonstrated.

REFERENCE COUNT: 76 THERE ARE 76 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 13 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:489363 CAPLUS Full-text

DOCUMENT NUMBER: 147:98329

TITLE: New strategies on solid oxide fuel cells

AUTHOR(S): Ruiz-Morales, Juan Carlos; Pena-Martinez, Juan; Marrero-Lopez, David; Perez-Coll, Domingo; Canales-Vazquez, Jesus; Irvine, John T. S.; Nunez, Pedro

CORPORATE SOURCE: Department of Inorganic Chemistry, University of La Laguna, La Laguna, E-38200, Spain

SOURCE: Materials Research Society Symposium Proceedings (2007), 972(Solid-State Ionics--2006), 139-147

CODEN: MRSPDH; ISSN: 0272-9172

PUBLISHER: Materials Research Society

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB Review of strategies to improve the efficiency of solid oxide fuel cells (SOFC) through the use of new anode materials, a novel method of microstructural optimization by means of polymeric templates, using composites or cermet-based materials or applying a new concept in SOFC, e.g. the sym. SOFC (SFC), with 27 refs. First, a new material,  $\text{La}_4\text{Sr}_8\text{TillMn}_{0.5}\text{Ga}_{0.5}\text{O}_{3-\delta}$  (LSTMG) is proposed as an alternative anode to the traditional Ni-YSZ cermets with enhanced hydrocarbon oxidation performance and high open circuit

voltages. Secondly, use of close-packed arrays of monodisperse spheres of poly (Me methacrylate) (PMMA) as a template was used to achieve microstructural optimization using an organic frame. Thirdly, the polarization resistance was halved using composites and cermet to improve the efficiency of materials. And finally, a novel concept, sym. solid oxide fuel cells (SFC), using the same materials as both cathode and anode, is presented as a solution for some problems related with the traditional SOFC, such as C-deposition and S-poisoning.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 14 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:393461 CAPLUS Full-text

DOCUMENT NUMBER: 148:148370

TITLE: High performance cathode-supported SOFC with perovskite anode operating in weakly humidified hydrogen and methane

AUTHOR(S): Chen, X. J.; Liu, Q. L.; Chan, S. H.; Brandon, N. P.; Khor, K. A.

CORPORATE SOURCE: Fuel Cell Strategic Research Programme, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, 639798, Singapore

SOURCE: Electrochemistry Communications (2007), 9(4), 767-772  
CODEN: ECCMF9; ISSN: 1388-2481

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A high performance cathode-supported solid oxide fuel cell (SOFC), suitable for operating in weakly humidified hydrogen and methane, has been developed. The SOFC is essentially made up of a yttria-stabilized zirconia (YSZ)/lanthanum strontium manganese oxide (LSM) composite supporting cathode, a thin YSZ film electrolyte, and a gadolinia-doped ceria (GDC)-impregnated La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3</sub> (LSCM) anode. A gas tight thin YSZ film (.apprx.27 µm) was formed during the co-sintering of cathode/electrolyte bi-layer at 1200°. The cathode-supported SOFC developed in this study showed encouraging performance with maximum power d. of 0.182, 0.419, 0.628 and 0.818 W/cm<sup>2</sup> in air/3% H<sub>2</sub>O-97% H<sub>2</sub> (and 0.06, 0.158, 0.221 and 0.352 W/cm<sup>2</sup> in air/3% H<sub>2</sub>O-97% CH<sub>4</sub>) at 750, 800, 850 and 900°, resp. Such performance is close to that of the cathode-supported cell (0.42 W/cm<sup>2</sup> vs. 0.455 W/cm<sup>2</sup> in humidified H<sub>2</sub> at 800°) developed by Yamahara et al. (2005) with a Co-infiltrated supporting LSM-YSZ cathode, a (Sc<sub>2</sub>O<sub>3</sub>)<sub>0.1</sub>(Y<sub>2</sub>O<sub>3</sub>)<sub>0.01</sub>(ZrO<sub>2</sub>)<sub>0.89</sub> (SYSZ) electrolyte of 15 µm in thickness and a SYSZ/Ni anode, indicating that the performance of the GDC-impregnated LSCM anode is comparable to that made of Ni cermet while stable in weakly humidified methane fuel.

REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 15 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:364328 CAPLUS Full-text

DOCUMENT NUMBER: 148:334915

TITLE: Synthesis and processing of perovskite oxides for solid oxide fuel cells anode fabrication

AUTHOR(S): Montinaro, Dario; Bertoldi, Massimo; Sglavo, Vincenzo M.

CORPORATE SOURCE: DIMTI, Universita degli Studi di Trento, Trento, I-38050, Italy

SOURCE: Advances in Science and Technology (Stafa-Zuerich, Switzerland) (2006), 45(11th International Ceramics Congress, 2006), 1864-1868

CODEN: ASETE5

PUBLISHER: Trans Tech Publications Ltd.  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB In the present work materials alternative to Ni/yttria-stabilized zirconia cermets used as anodes for solid oxide fuel cells have been studied in order to overcome the problems related to catalytic deposition of carbon and the limited tolerance to sulfur. Anodes consisting of  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$  (LSCM25) have been investigated with regard to synthesis and processing related problems. Single phase LSCM25 perovskites were synthesized by urea/nitrates gel combustion method and the as prepared powders were used to produce green tapes by tape casting processing. Thick LSCM25 substrates, suitable as anodes in anode-supported solid oxide fuel cell fabrication, were successfully obtained by sintering of green LSCM25 laminates.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 16 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:322188 CAPLUS Full-text

DOCUMENT NUMBER: 147:326141

TITLE: Preparation and characterization of systematic component materials of intermediate-temperature solid oxide fuel cell

AUTHOR(S): Liu, Rong-hui; Ma, Wen-hui; Wang, Hua; Dai, Yong-nian; Yang, Bin

CORPORATE SOURCE: Faculty of Materials and Metallurgical Engineering, Kunming University of Science and Technology, Kunming Yunnan, 650093, Peop. Rep. China

SOURCE: Dianyuan Jishu (2007), 31(2), 109-112  
CODEN: DIJIFT; ISSN: 1002-087X

PUBLISHER: Dianyuan Jishu Bianjibu

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB  $\text{La}_{1-x}\text{Sr}_x\text{Ga}_{1-y}\text{Mg}_y\text{O}_{3-\delta}$  (LSGM) electrolyte and  $\text{La}_{1-x}\text{Sr}_x\text{Cr}_{1-y}\text{Mn}_y\text{O}_{3-\delta}$  (LSCM) anode were synthesized by solid-state reaction method, and  $\text{La}_{1-x}\text{Sr}_x\text{Fe}_y\text{Co}_{1-y}\text{O}_{3-\delta}$  (LSFC) cathode by sol-gel method. The microstructure and characteristics of them were tested by X-ray diffraction (XRD), scanning electron microscopy (SEM), AC impedance, and four-probe d.c. methods. Pure phase LSGM was obtained after sintering for 24 h at both 1,450°C and 1,480°C. Pure phase LSCM was obtained after sintering for 15 h at both 1,250°C and 1,350°C, and the total conductivity of LSCM was 1.5 S/cm at 850°C. AC impedance spectra showed that LSGM had good ionic conductivity. Single-phase LSFC was obtained when its precursor was sintered for two times at 400°C and 750°C, resp. LSCM anode and LSFC (LSCM) composite cathode films were prepared with screen printing method by sintering at 1,150°C. The performance of cell consisting of the above composite membrane was investigated.

L9 ANSWER 17 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:270763 CAPLUS Full-text

DOCUMENT NUMBER: 148:565101

TITLE: Effect of sonochemical, regenerative sol gel, and microwave assisted synthesis techniques on the formation of dense electrolytes and porous electrodes for all perovskite IT-SOFCs

AUTHOR(S): Jena, Hrudananda; Rambabu, B.

CORPORATE SOURCE: Solid State Ionics Laboratory, Department of Physics, Southern University and A and M College, Baton Rouge,

SOURCE: LA, 70813, USA  
Proceedings of the International Conference on Fuel  
Cell Science, Engineering, and Technology, 4th,  
Irvine, CA, United States, June 19-21, 2006 (2006),  
Volume Pt. B, 793-819. American Society of Mechanical  
Engineers: New York, N. Y.  
CODEN: 69IZY6; ISBN: 0-7918-4247-9

DOCUMENT TYPE: Conference  
LANGUAGE: English

AB The effect of preparation techniques on the microstructure, grain-size and consequently on the elec. transport properties of the ABO<sub>3</sub> structured materials used as electrode and electrolytes in all perovskite IT-SOFC were studied. Nano-crystalline powders of La<sub>1-x</sub>M<sub>x</sub>Ga<sub>1-y</sub>NyO<sub>3±δ</sub> (M =Sr,.box.; x = - 0.10 to 0.15; N =Mg; y = -0.10 to 0.15) (LSGM) as electrolyte, porous La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3±δ</sub> (LSCF) or LaNi<sub>1-x</sub>FexO<sub>3±δ</sub> (x =0-0.5) (LNF) as cathode, La<sub>0.8</sub>Sr<sub>0.2</sub>Cr<sub>0.7</sub>Mn<sub>0.3</sub>O<sub>3±δ</sub> (LSCM) as anode and LaCrO<sub>3</sub> or substituted LaCrO<sub>3</sub> as interconnect were synthesized by various wet chemical methods. The wet chemical methods like metal-carboxylate gel decomposition, hydroxide co-precipitation, sonochem. and regenerative sol-gel process followed by microwave sintering of the powders have been used. Microwave sintering parameters were optimized by varying sintering time, and temperature to achieve higher d. of LSGM pellets. The phase pure systems were obtained at sintering duration of 30 min at 1200°. The XRD, HR-TEM, and SEM measurements revealed the average grain size of these perovskites was .apprx.22 nm range. The elec. conductivities of the compns. were measured by ac (5 Hz-13 MHz) and dc techniques. The conductivity of the sintered pellets was found to be .apprx.0.01-0.21 S/cm at 550-1000° range for electrolyte and 1.5-100 S/cm at 25-1000° for electrodes, resp. The effect of sonochem., and regenerative sol-gel methods in processing large quantities of nano-crystalline perovskites with multi-element substitutions at A- and B-sites to achieve physico-chemical compatibility for fabricating zero emission all perovskite IT-SOFCs are reported in this paper.

REFERENCE COUNT: 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 18 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:171673 CAPLUS Full-text

DOCUMENT NUMBER: 146:320143

TITLE: Manufacture of moderate-temperature solid  
oxide fuel cell from  
LaGaO<sub>3</sub>-, LaCrO<sub>3</sub>- and LaFeO<sub>3</sub>-based materials

INVENTOR(S): Ma, Wenhui; Yang, Bin; Wang, Hua; Dai, Yongnian; Liu,  
Ronghui; Liu, Dachun; Yu, Jie; Xu, Baoqiang; Li,  
Weihong; Liu, Yongcheng; Yang, Buzheng

PATENT ASSIGNEE(S): Kunming University of Science and Technology, Peop.  
Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 11pp.  
CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
CN 1913208	A	20070214	CN 2006-10011052	20060717
PRIORITY APPLN. INFO.:			CN 2006-10011052	20060717

AB The title fuel cell is manufactured from LaGaO<sub>3</sub>-, LaCrO<sub>3</sub>- and LaFeO<sub>3</sub>-based materials as electrolyte, cathode, and anode, resp. The LaGaO<sub>3</sub>-, LaCrO<sub>3</sub>- and



LaFeO<sub>3</sub>-based materials are prepared with solid-phase or wet-phase chemical method. The fuel cell is then manufactured based on the types of supporting structures. These materials in the fuel cell have good comprehensive properties at moderate and low temperature (<850°) such as good chemical and thermal compatibility of the electrode and the electrolyte, slow attenuation of the fuel cell performance, good carbon-accumulation-resistant performance of the anode material, small polarization loss of the cathode, high tolerance to sulfur and nitrogen fuel, and broad selection range of fuel.

L9 ANSWER 19 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:154675 CAPLUS Full-text

DOCUMENT NUMBER: 148:57957

TITLE: High-performance (La,Sr)(Cr,Mn)O<sub>3</sub>/(Gd,Ce)O<sub>2</sub>- $\delta$  composite anode for direct oxidation of methane

AUTHOR(S): Chen, X. J.; Liu, Q. L.; Khor, K. A.; Chan, S. H.

CORPORATE SOURCE: Fuel Cell Strategic Research Programme, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, 639798, Singapore

SOURCE: Journal of Power Sources (2007), 165(1), 34-40

CODEN: JPSODZ; ISSN: 0378-7753

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A novel (La,Sr)(Cr,Mn)O<sub>3</sub>/(Gd,Ce)O<sub>2</sub>- $\delta$  (LSCM/GDC) composite electrode was developed and applied as solid oxide fuel cell (SOFC) anode for direct oxidation of methane. The optimum composition of the composite anode is 33% LSCM and 67% GDC. At an output c.d. of 0.5 A/cm<sup>2</sup>, the overpotential of the anode in wet H<sub>2</sub> and CH<sub>4</sub> at 850° is 0.073 and 0.248 V (i.e., an anodic resistance of 0.146 and 0.496  $\Omega \cdot \text{cm}^2$ ), resp. The oxidation of CH<sub>4</sub> on the composite anode was studied by electrochem. impedance spectroscopy under different temps. and with a d.c. bias. The stability of the LSCM/GDC composite anode was evaluated under different current loadings in wet CH<sub>4</sub> at 850° for 50 h. The results show that this LSCM/GDC composite anode has good stability in CH<sub>4</sub> and has an electrochem. performance that is comparable with a Ni cermet anode.

REFERENCE COUNT: 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 20 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:125522 CAPLUS Full-text

DOCUMENT NUMBER: 146:383338

TITLE: Performance of XSCoF (X=Ba, La and Sm) and LSCrX' (X'=Mn, Fe and Al) perovskite-structure materials on LSGM electrolyte for IT-SOFC

AUTHOR(S): Pena-Martinez, J.; Marrero-Lopez, D.; Perez-Coll, D.; Ruiz-Morales, J. C.; Nunez, P.

CORPORATE SOURCE: Inorganic Chemistry Department, University of La Laguna, Tenerife, 38200, Spain

SOURCE: Electrochimica Acta (2007), 52(9), 2950-2958

CODEN: ELCAAV; ISSN: 0013-4686

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB X<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3</sub>- $\delta$  (X = Ba, La and Sm) and La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>X<sub>0.5</sub>O<sub>3</sub>- $\delta$  (X = Mn, Fe and Al) mixed ionic-electronic conducting perovskite-based oxides were tested as SOFC electrode materials on La<sub>0.9</sub>Sr<sub>0.1</sub>Ga<sub>0.8</sub>Mg<sub>0.2</sub>O<sub>2.85</sub> (LSGM) electrolytes under different atms. (air, oxygen, argon and dry and wet 5% H<sub>2</sub>/Ar) and the area-specific resistances (ASR) were compared.

Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3-δ</sub> (BSCoF) possesses the lowest ASR values in air (0.04 Ω cm<sup>2</sup> at 1073 K) while La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> (LSCrM) possesses the lowest ASR values in wet 5% H<sub>2</sub>/Ar (0.28 Ω cm<sup>2</sup> at 1073 K). Fuel cell tests were carried out using wet 5% H<sub>2</sub>/Ar as fuel and air as oxidant. The maximum power d. (.apprx.123 mW cm<sup>-2</sup>) at 1073 K was reached with the electrolyte-supported system BSCoF/LSGM/LSCrM (.apprx.1.5 mm electrolyte thickness). Also, LSCrX' materials were used simultaneously as cathode and anode in fuel cell tests and the sym. system LSCrM/LSGM/LSCrM (.apprx.1.5 mm electrolyte thickness) reached a maximum power d. of .apprx.54 mW cm<sup>-2</sup> at 1073 K.

REFERENCE COUNT: 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 21 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:98576 CAPLUS Full-text

DOCUMENT NUMBER: 147:544429

TITLE: Mixed conductivity and electrochemical behavior of (La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>0.95</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub>

AUTHOR(S): Kharton, V. V.; Tsipis, E. V.; Marozau, I. P.; Viskup, A. P.; Frade, J. R.; Irvine, J. T. S.

CORPORATE SOURCE: Department of Ceramics and Glass Engineering, CICECO, University of Aveiro, 193 Aveiro, 3810, Port.

SOURCE: Solid State Ionics (2007), 178(1-2), 101-113

CODEN: SSIOD3; ISSN: 0167-2738

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The electronic and oxygen-ionic transport in (La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>0.95</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub>, a member of promising family of solid oxide fuel cell (SOFC) anode materials, was studied at 1023-1273 K in the oxygen partial pressure range from 10<sup>-20</sup> to 0.5 atmospheric. In oxidizing and moderately reducing atmospheres, this perovskite exhibits a predominant p-type electronic conductivity, which lies in the range 20-35 S/cm and is essentially p(O<sub>2</sub>)-independent. Reducing p(O<sub>2</sub>) below 10<sup>-16</sup>-10<sup>-12</sup> atm leads to a drastic increase in the oxygen vacancy concentration, ionic conductivity and oxygen permeability, while the total conductivity decreases down to 1-3 S/cm. The ion transference nos., calculated from the oxygen permeation data and measured by the faradaic efficiency technique controlling oxygen pressures at both sides of dense ceramic membranes, vary in the range 9 + 10<sup>-7</sup> to 8 + 10<sup>-5</sup> at 1223-1273 K, increasing with temperature. The average thermal expansion coeffs. in air increases from 10.8 + 10<sup>-6</sup> K<sup>-1</sup> at 373-923 K up to 14.1 + 10<sup>-6</sup> K<sup>-1</sup> at 1223-1523 K. Under both oxidizing and reducing conditions, the electrochem. behavior of porous (La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>0.95</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub>-based electrodes applied onto (La<sub>0.9</sub>Sr<sub>0.1</sub>)<sub>0.98</sub>Ga<sub>0.8</sub>Mg<sub>0.2</sub>O<sub>3-δ</sub> solid electrolyte suggests a key role of electronic transport-related processes. As a result, the electrode performance can be significantly enhanced by optimizing current collector and/or by introducing an addnl. electronically-conductive component, such as metallic Ni or Ag. Further decrease of overpotentials may be achieved via incorporation of electrocatalytically active addns., including praseodymium oxide in oxidizing atmospheres and ceria at low p(O<sub>2</sub>).

REFERENCE COUNT: 44 THERE ARE 44 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 22 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2007:72810 CAPLUS Full-text

DOCUMENT NUMBER: 146:232657

TITLE: Method for manufacturing cathode of solid oxide fuel cell

INVENTOR(S): Gao, Jianfeng; Meng, Guangyao

PATENT ASSIGNEE(S): University of Science and Technology of China, Peop.

SOURCE: Rep. China  
 Faming Zhuanli Shenqing Gongkai Shuomingshu, 9pp.  
 CODEN: CNXXEV  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Chinese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----
CN 1897337	A	20070117	CN 2005-10041053	20050714
PRIORITY APPLN. INFO.:			CN 2005-10041053	20050714

AB The title method comprises using porous perovskite doped lanthanum chromate or doped titanate composite oxides as cathode framework and main electron conducting phase, and preparing a film of nanoparticle porous active substance with thickness of 0.05-5  $\mu\text{m}$  on the inner and outer surface of the cathode framework by ion immersion, polymer template, sol-gel processing, or coating of suspension particle slurry. The active substances contain cerium dioxide, doped cerium dioxide, zirconium dioxide-based oxygen ion conducting electrolyte, cerate-based proton conducting electrolyte, or their mixture, and can include a small quantity of nickel or nickel-copper, and V2O5. The obtained cathode of solid oxide fuel cell has stable structure under cell preparation and operation condition, high conductivity, high catalytic activity, stable size, carbon accumulation resistance, sulfur resistance, etc., and is suitable for direct operation of hydrocarbon fuel.

L9 ANSWER 23 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:958724 CAPLUS Full-text  
 DOCUMENT NUMBER: 145:492192  
 TITLE: On the simultaneous use of

La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3- $\delta$</sub>  as both anode and cathode material with improved microstructure in solid oxide fuel cells

AUTHOR(S): Ruiz-Morales, Juan Carlos; Canales-Vazquez, Jesus; Pena-Martinez, Juan; Lopez, David Marrero; Nunez, Pedro

CORPORATE SOURCE: Dpto. Quimica Inorganica, Universidad de La Laguna, Tenerife, 38200, Spain

SOURCE: Electrochimica Acta (2006), 52(1), 278-284  
 CODEN: ELCAAV; ISSN: 0013-4686

PUBLISHER: Elsevier B.V.  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB A new concept of a solid oxide fuel cell using simultaneously the same electrode material at the anode and cathode sides with improved microstructure is proposed. We have found that La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3- $\delta$</sub>  (LSCM) can be considered as a good candidate for such configuration, sym. fuel cells, due to its enhanced electrochem. properties in both reducing and oxidizing conditions. LSCM-based sym. fuel cells offer promising performances, e.g., 0.5 and 0.3 W/cm<sup>2</sup> at 950° using H<sub>2</sub> and CH<sub>4</sub>, resp., as fuels. Finally, the optimization of the microstructure has been achieved via a novel facile procedure, using poly(Me methacrylate) microspheres as templates.

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 24 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:899845 CAPLUS Full-text

DOCUMENT NUMBER: 146:465095  
TITLE: Fuel cell studies of perovskite-type materials for IT-SOFC  
AUTHOR(S): Pena-Martinez, J.; Marrero-Lopez, D.; Ruiz-Morales, J. C.; Buergler, B. E.; Nunez, P.; Gauckler, L. J.  
CORPORATE SOURCE: Nonmetallic Inorganic Materials, Department of Materials, ETH-Zurich, Switz.  
SOURCE: Journal of Power Sources (2006), 159(2), 914-921  
CODEN: JPSODZ; ISSN: 0378-7753  
PUBLISHER: Elsevier B.V.  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The electrochem. performance of solid oxide fuel cells (SOFCs) based on perovskite-type materials (ABO<sub>3</sub>) was studied. La<sub>0.9</sub>Sr<sub>0.1</sub>Ga<sub>0.8</sub>Mg<sub>0.2</sub>O<sub>3-δ</sub> (LSGM) ceramics were used as electrolyte and a composite containing La<sub>0.8</sub>Sr<sub>0.2</sub>MnO<sub>3</sub> (LSM) as cathode. Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3-δ</sub> (BSCF) was also used as cathode and La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> (LSCM) as anode materials. Also, fluorite-type Sm<sub>0.15</sub>Ce<sub>0.85</sub>O<sub>2-δ</sub> (SDC) material was used as buffer layer between the electrolyte and the anode to avoid possible interfacial reactions. The maximum power d. value of BSCF/LSGM/LSCM with 1.5 mm thick electrolyte supported cell was 160 mW cm<sup>-2</sup> at 1073 K, using moist H<sub>2</sub> diluted with N<sub>2</sub> as fuel and air as oxidant.  
REFERENCE COUNT: 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 25 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2006:672493 CAPLUS Full-text  
DOCUMENT NUMBER: 146:65571  
TITLE: La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> + Cu composite anode running on H<sub>2</sub> and CH<sub>4</sub> fuels  
AUTHOR(S): Wan, J.; Zhu, J. H.; Goodenough, J. B.  
CORPORATE SOURCE: Texas Materials Institute, ETC 9.102, The University of Texas at Austin, Austin, TX, 78712, USA  
SOURCE: Solid State Ionics (2006), 177(13-14), 1211-1217  
CODEN: SSIOD3; ISSN: 0167-2738  
PUBLISHER: Elsevier B.V.  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB La<sub>1-x</sub>Sr<sub>x</sub>Cr<sub>1-x</sub>M<sub>x</sub>O<sub>3-δ</sub> (M = Cr, Fe, V) system has been studied as anode materials for solid oxide fuel cells (SOFCs). The perovskite La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> (LSCM) is stable in both H and CH<sub>4</sub> atmospheres at ≤1000°. However, in the reducing atmospheres of H and CH<sub>4</sub>, its electronic conductivity is greatly reduced from its value in air. We have characterized LSCM as the anode of a SOFC having 250 μm-thick La<sub>0.8</sub>Sr<sub>0.2</sub>Ga<sub>0.83</sub>Mg<sub>0.17</sub>O<sub>2.815</sub> (LSGM) as the electrolyte and SrCo<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3-δ</sub> (SCF) as the cathode. We report a comparison of the overpotentials at the following anodes: (1) La<sub>0.4</sub>Ce<sub>0.6</sub>O<sub>1.8</sub> (LDC) + NiO composite in H, (2) porous LSCM in H and CH<sub>4</sub>, (3) porous LSCM impregnated with CuO in H and CH<sub>4</sub> and (4) porous LSCM impregnated with CuO and sputtered with Pt in H and CH<sub>4</sub>. An LSCM + CuO + Pt anode gave a maximum power output at 850° of 850 and 520 mW/cm<sup>2</sup>, resp., with H and CH<sub>4</sub> as fuel whereas anode (1) gave 1.4 W/cm<sup>2</sup> at 800° in H. There was no noticeable coke formation in CH<sub>4</sub> with anodes (2), (3) and (4), which demonstrates that the perovskite oxide is a plausible option for the anode of a SOFC operating with hydrocarbon fuels. We also report the moisture effect in the H and CH<sub>4</sub> fuel-oxidation process.  
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 26 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:630605 CAPLUS Full-text  
DOCUMENT NUMBER: 146:233859  
TITLE: Electrical properties of the lanthanum ferrite-based cathode materials for low-temperature SOFCs  
AUTHOR(S): Kang, Ju Hyun; Choi, Jung Woon; Shim, Han Byel; Yoo, Kwang Soo  
CORPORATE SOURCE: Dep. Mater. Sci. Eng., Univ. Seoul, Seoul, 130-743, S. Korea  
SOURCE: Journal of the Korean Ceramic Society (2006), 43(3), 162-168  
CODEN: JKCSBW  
PUBLISHER: Korean Ceramic Society  
DOCUMENT TYPE: Journal  
LANGUAGE: Korean  
AB The perovskites with nominal compns.  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Fe}_{1-x}\text{M}_x\text{O}_3$  ( $\text{M}=\text{Co}, \text{Mn}, \text{Ni}$ ,  $x=0.1-0.3$ ) were fabricated by a solid-state reaction method as cathode materials of low-temperature operating Solid Oxide Fuel Cells (SOFCs). X-ray diffraction anal. and microstructure observation for the sintered samples were performed. The a.c. complex impedance were measured in the temperature range 600-900°C in air and fitted with a Solatron ZView program. The elec. conductivity and polarization resistance of  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Fe}_{1-x}\text{M}_x\text{O}_3$  ( $\text{M}=\text{Co}, \text{Mn}, \text{Ni}$ ,  $x=0.1-0.3$ ) were characterized systematically. The porosities of the sintered samples were 25-38%. The polarization resistance of  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Fe}_{0.7}\text{M}_{0.3}\text{O}_3$  was  $0.291 \Omega \cdot \text{cm}^2$  at 700°C.

L9 ANSWER 27 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:351118 CAPLUS Full-text  
DOCUMENT NUMBER: 145:86399  
TITLE: A symmetrical solid oxide fuel cell demonstrating redox stable perovskite electrodes  
AUTHOR(S): Bastidas, David M.; Tao, Shanwen; Irvine, John T. S.  
CORPORATE SOURCE: School of Chemistry, University of St Andrews, Fife, KY16 9ST, UK  
SOURCE: Journal of Materials Chemistry (2006), 16(17), 1603-1605  
CODEN: JMACEP; ISSN: 0959-9428  
PUBLISHER: Royal Society of Chemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB The perovskite ( $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_3$  (LSCM) is shown to be an effective, redox-stable electrode that can be used for both cathode and anode SOFC operation, to provide a sym. fuel cell system with good performance characteristics.

REFERENCE COUNT: 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 28 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:350449 CAPLUS Full-text  
DOCUMENT NUMBER: 145:66170  
TITLE: GDC-Impregnated ( $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_3$ ) Anodes for Direct Utilization of Methane in Solid Oxide Fuel Cells  
AUTHOR(S): Jiang, S. P.; Chen, X. J.; Chan, S. H.; Kwok, J. T.  
CORPORATE SOURCE: School of Mechanical and Aerospace Engineering, Nanyang Technological University, 639798, Singapore  
SOURCE: Journal of the Electrochemical Society (2006), 153(5), A850-A856  
CODEN: JESQAN; ISSN: 0013-4651

PUBLISHER: Electrochemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Gd-doped ceria (GDC)-impregnated (La<sub>0.75</sub>Sr<sub>0.25</sub>)(Cr<sub>0.5</sub>Mn<sub>0.5</sub>)O<sub>3</sub> (LSCM) is studied as an alternative Ni-free anode for the direct use of methane in solid oxide fuel cells.

Impregnation of submicrometer and ionic conducting GDC greatly improves the electrocatalytic activity of the LSCM anodes for the oxidation reaction in weakly humidified (3% H<sub>2</sub>O) methane. At 800°, electrode polarization resistance for the reaction in wet CH<sub>4</sub> is 0.44  $\Omega$  cm<sup>2</sup> on a 4.0 mg cm<sup>-2</sup> GDC-impregnated LSCM anode. In comparison, the electrode polarization resistance is 11.4 and 8.1  $\Omega$  cm<sup>2</sup> on a pure LSCM and a LSCM (50%)/yttria-stabilized zirconia (YSZ) (50%) composite anode, resp., under the same testing conditions. The polarization performance of GDC-impregnated LSCM is also substantially higher than that of the pure LSCM and LSCM/YSZ composite anodes. Based on the results, a mechanism involving the dry reforming of methane, followed by the electrochem. oxidation of the dry reforming products is proposed for the methane oxidation on Ni-free mixed ionic and electronic conductors such as LSCM. Impregnation of nanosized GDC greatly enhances the catalytic as well as electrochem. activities for the dry reforming of methane and for the electrochem. oxidation reactions of the dry reforming products.

REFERENCE COUNT: 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 29 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:337000 CAPLUS Full-text

DOCUMENT NUMBER: 145:48461

TITLE: Double Perovskites as Anode Materials for Solid-Oxide Fuel Cells

AUTHOR(S): Huang, Yun-Hui; Dass, Ronald I.; Xing, Zheng-Liang; Goodenough, John B.

CORPORATE SOURCE: Texas Materials Institute, University of Texas at Austin, Austin, TX, 78712, USA

SOURCE: Science (Washington, DC, United States) (2006), 312(5771), 254-257

CODEN: SCIEAS; ISSN: 0036-8075

PUBLISHER: American Association for the Advancement of Science

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Extensive efforts to develop a solid-oxide fuel cell for transportation, the bottoming cycle of a power plant, and distributed generation of elec. energy are motivated by a need for greater fuel efficiency and reduced air pollution. Barriers to the introduction of hydrogen as the fuel have stimulated interest in developing an anode material that can be used with natural gas under operating temps. 650° < T < 1000°C. Here the authors report identification of the double perovskites Sr<sub>2</sub>Mg<sub>1-x</sub>Mn<sub>x</sub>MoO<sub>6-δ</sub> that meet the requirements for long-term stability with tolerance to sulfur and show a superior single-cell performance in hydrogen and methane.

REFERENCE COUNT: 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 30 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2006:90859 CAPLUS Full-text

DOCUMENT NUMBER: 144:353656

TITLE: Microstructural optimization of materials for SOFC applications using PMMA microspheres

AUTHOR(S): Ruiz-Morales, Juan Carlos; Canales-Vazquez, Jesus; Pena-Martinez, Juan; Marrero-Lopez, David; Irvine,

CORPORATE SOURCE: John T. S.; Nunez, Pedro  
Dpto. Quimica Inorganica, Universidad de La Laguna,  
Tenerife, CP:38200, Spain  
SOURCE: Journal of Materials Chemistry (2006), 16(6), 540-542  
CODEN: JMACEP; ISSN: 0959-9428  
PUBLISHER: Royal Society of Chemistry  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB A novel way to control the porosity of materials for Solid Oxide Fuel Cells (SOFCs) was developed through a combination of oxide powder, polyvinyl alc. and poly(Me methacrylate) (PMMA) microspheres. This method allows the microstructure to be optimized, improving the performance of SOFC electrode materials.  
REFERENCE COUNT: 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 31 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2006:39014 CAPLUS Full-text  
DOCUMENT NUMBER: 144:295800  
TITLE: Anodic Performance and Intermediate Temperature Fuel Cell Testing of La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> at Lanthanum Gallate Electrolytes  
AUTHOR(S): Pena-Martinez, J.; Marrero-Lopez, D.; Ruiz-Morales, J. C.; Savaniu, C.; Nunez, P.; Irvine, J. T. S.  
CORPORATE SOURCE: Inorganic Chemistry Department, University of La Laguna, Tenerife, Canary Islands, 38200, Spain  
SOURCE: Chemistry of Materials (2006), 18(4), 1001-1006  
CODEN: CMATEX; ISSN: 0897-4756  
PUBLISHER: American Chemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB This study is focused on the electrochem. performance of perovskite-type materials based on doped LaGaO<sub>3</sub> (LGO). La<sub>0.9</sub>Sr<sub>0.1</sub>Ga<sub>0.8</sub>Mg<sub>0.2</sub>O<sub>3-δ</sub> (LSGM) and La<sub>0.9</sub>Sr<sub>0.1</sub>Ga<sub>0.8</sub>Mg<sub>0.115</sub>Co<sub>0.085</sub>O<sub>3-δ</sub> (LSGMCo) were used as electrolytes and La<sub>0.8</sub>Sr<sub>0.2</sub>MnO<sub>3-δ</sub> (LSM) and La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> (LSCM) as cathode and anode material, resp. Much better performance was obtained at an LSGM electrolyte than at LSGMCo, probably due to interfacial reactions between LSGMCo and LSM. An LSGM electrolyte was prepared by tape casting with a thickness of .apprx.120 μm and good values of power output in a conventional electrolyte-supported cell were achieved, 425 and 570 mW/cm<sup>2</sup> using wet 5% H<sub>2</sub>/Ar and pure hydrogen as fuel, resp., and pure O<sub>2</sub> as oxidant at 1073 K.  
REFERENCE COUNT: 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 32 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2005:1347291 CAPLUS Full-text  
DOCUMENT NUMBER: 145:252175  
TITLE: (La<sub>0.75</sub>Sr<sub>0.25</sub>)(Cr<sub>0.5</sub>Mn<sub>0.5</sub>)O<sub>3</sub>/YSZ composite anodes for methane oxidation reaction in solid oxide fuel cells  
AUTHOR(S): Jiang, S. P.; Chen, X. J.; Chan, S. H.; Kwok, J. T.; Khor, K. A.  
CORPORATE SOURCE: School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore, 639798, Singapore  
SOURCE: Solid State Ionics (2006), 177(1-2), 149-157  
CODEN: SSIOD3; ISSN: 0167-2738  
PUBLISHER: Elsevier B.V.  
DOCUMENT TYPE: Journal

LANGUAGE: English

AB The synthesis and performance of (La<sub>0.75</sub>Sr<sub>0.25</sub>)(Cr<sub>0.5</sub>Mn<sub>0.5</sub>)O<sub>3</sub>/Y<sub>2</sub>O<sub>3</sub>-ZrO<sub>2</sub> (LSCM/YSZ) composites are investigated as alternative anodes for the direct utilization of methane (i.e., natural gas) in solid oxide fuel cells. Addition of YSZ phase greatly improves the adhesion and reduces the electrode polarization resistance of the LSCM/YSZ composite anodes. LSCM/YSZ composite anodes show reasonably good performance for the methane oxidation reaction in wet CH<sub>4</sub> and the best electrode performance was achieved for the composite with LSCM contents of 50–60 weight% with polarization resistances of 2–3 Ω cm<sup>2</sup> in 97% CH<sub>4</sub>/3% H<sub>2</sub>O at 850°C. The electrode impedance for the methane oxidation in wet CH<sub>4</sub> on the LSCM/YSZ composite anodes was characterized by three separable arcs and the electrode behavior could be explained based on the ALS model for the reaction on the MIEC electrode. The results indicate that electrocatalytic activity of the LSCM/YSZ composite anodes for the methane oxidation is likely limited by the oxygen vacancy diffusion in the substituted lanthanum chromite-based materials.

REFERENCE COUNT: 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 33 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2005:1050035 CAPLUS Full-text

DOCUMENT NUMBER: 144:415780

TITLE: Cathodic characteristics of (La<sub>0.6</sub>Sr<sub>0.4</sub>)(Mn<sub>1-x</sub>Fe<sub>x</sub>)O<sub>3-δ</sub> for a solid oxide fuel cell with a (Ba<sub>0.3</sub>Sr<sub>0.2</sub>La<sub>0.5</sub>)InO<sub>2.75</sub> electrolyte

AUTHOR(S): Kakinuma, Katsuyoshi; Machida, Shingo; Arisaka, Tooru; Yamamura, Hiroshi; Atake, Tooru

CORPORATE SOURCE: Department of Applied Chemistry, Faculty of Engineering, Kanagawa University, Kanagawa-ku, Yokohama, 221-8686, Japan

SOURCE: Solid State Ionics (2005), 176(31-34), 2405-2410  
CODEN: SSIOD3; ISSN: 0167-2738

PUBLISHER: Elsevier B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors have conducted an elec. power generation experiment using a single cell of solid oxide fuel cell (SOFC) with (Ba<sub>0.3</sub>Sr<sub>0.2</sub>La<sub>0.5</sub>)InO<sub>2.75</sub> as an electrolyte at an operating temperature of 800 °C. A moistened 10% hydrogen/argon mixture constituted the fuel gas, and air was the oxidant gas. As cathode and anode materials, the authors selected (La<sub>0.6</sub>Sr<sub>0.4</sub>)(Mn<sub>1-x</sub>Fe<sub>x</sub>)O<sub>3-δ</sub> (x = 0–0.6) and Ni, resp. The power d. proved to be dependent on the Fe content of the cathode; use of (La<sub>0.6</sub>Sr<sub>0.4</sub>)(Mn<sub>0.6</sub>Fe<sub>0.4</sub>)O<sub>3-δ</sub> as a cathode material enabled one to reach a maximum power d. of 0.58 W/cm<sup>2</sup>. An anal. of x-ray Absorption Near-Edge Structure (XANES) taken to detect mixed valence of Mn and Fe showed that each valence was over 3.0. The authors also studied, by x-ray diffraction and energy dispersive x-ray anal. (EDX), the diffusion of the constituent elements around the interface between the cathode and the electrolyte. The Mn, Fe and In diffused to the opposite phase. The interface resistance between electrolyte and electrode, which was measured by the d.c. two-probe method, reached a min. value at x = 0.4, suggesting that the electronic conductivity of the interface would strongly affect the power generation.

REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 34 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2005:674394 CAPLUS Full-text

DOCUMENT NUMBER: 143:156249



TITLE: An efficient solid oxide  
fuel cell based upon single-phase  
perovskites  
AUTHOR(S): Tao, Shanwen; Irvine, John T. S.; Kilner, John A.  
CORPORATE SOURCE: School of Chemistry, University of St Andrews, Fife,  
KY16 9ST, UK  
SOURCE: Advanced Materials (Weinheim, Germany) (2005), 17(14),  
1734-1737  
CODEN: ADVMEW; ISSN: 0935-9648  
PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB An all-perovskite solid oxide fuel cell has been achieved using  
(La<sub>0.75</sub>Sr<sub>0.25</sub>)<sub>0.95</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub> as the anode, La<sub>0.8</sub>Sr<sub>0.2</sub>Ga<sub>0.8</sub>Mg<sub>0.15</sub>Co<sub>0.05</sub>O<sub>3-δ</sub>  
as the electrolyte, and Gd<sub>0.4</sub>Sr<sub>0.6</sub>CoO<sub>3-δ</sub> as the cathode. The all-perovskite  
design enhances structural integrity and minimizes interface polarization  
losses.  
REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 35 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2005:506387 CAPLUS Full-text  
DOCUMENT NUMBER: 143:100224  
TITLE: Electrical properties and sulfur tolerance of  
La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>1-x</sub>Mn<sub>x</sub>O<sub>3</sub> under anodic conditions  
AUTHOR(S): Zha, Shaowu; Tsang, Philip; Cheng, Zhe; Liu, Meilin  
CORPORATE SOURCE: School of Materials Science and Engineering, Georgia  
Institute of Technology, Atlanta, GA, 30332-0245, USA  
SOURCE: Journal of Solid State Chemistry (2005), 178(6),  
1844-1850  
CODEN: JSSCBI; ISSN: 0022-4596  
PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English  
AB Complex metal oxides with composition of La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>1-x</sub>Mn<sub>x</sub>O<sub>3</sub> (x = 0.4, 0.5,  
0.6) (LSCM) have been synthesized and examined as anode materials for solid  
oxide fuel cells. LSCM compns. show excellent tolerance to both reduction and  
oxidation but the crystal structure transforms from hexagonal in air to  
orthorhombic in H<sub>2</sub>. The volume change associated with this phase  
transformation is only about 1%, thus having little effect on other  
properties. The total elec. conductivity increases with the content of Mn,  
whereas the resistance to sulfur poisoning increases with the content of Cr.  
Fuel cells using LSCM as the anode show very good performance when pure  
hydrogen is used as the fuel. However, they do not appear to be stable in  
fuels containing 10% H<sub>2</sub>S.  
REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 36 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN  
ACCESSION NUMBER: 2005:142822 CAPLUS Full-text  
DOCUMENT NUMBER: 144:54228  
TITLE: Microstructure and electrical conductivity studies of  
(La,Sr)(Cr,Mn,Co)O<sub>3</sub>  
AUTHOR(S): Ozcan, Soydan; Koc, Rasit  
CORPORATE SOURCE: Department of Mechanical Engineering and Energy  
Processes, Southern Illinois University, Carbondale,  
IL, 62901-6603, USA  
SOURCE: Ceramic Transactions (2005), 161(Developments in Solid  
Oxide Fuel Cells and Lithium Ion Batteries), 13-20  
CODEN: CETREW; ISSN: 1042-1122

PUBLISHER: American Ceramic Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB The LaCrO<sub>3</sub>-LaMnO<sub>3</sub>-LaCoO<sub>3</sub> system was investigated in order to develop an improved cathode material for solid oxide fuel cells (SOFCs). The formation of a solid solution by the ternary oxide mixture was confirmed by the X-ray diffraction pattern. Sintering studies conducted in air at 1500 °C produced compns. at the center of the ternary which exhibited 95% of theor. d. The AC elec. conductivity of compns. measured in air from 373K to 1073K increased significantly as Co content increased. At 1073K, the elec. conductivity ranged from 13 S/cm for La<sub>0.5</sub>Sr<sub>0.5</sub>Cr<sub>0.7</sub>Mn<sub>0.1</sub>Co<sub>0.2</sub>O<sub>3</sub> to 55 S/cm for La<sub>0.9</sub>Sr<sub>0.1</sub>Cr<sub>0.5</sub>Mn<sub>0.1</sub>Co<sub>0.4</sub>O<sub>3</sub>. The results observed during sintering and AC elec. conductivity testing provide a basis for evaluation of the mixed material for practical applications.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 37 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2005:36871 CAPLUS Full-text  
DOCUMENT NUMBER: 144:54216  
TITLE: Synthesis and electrochemical characterization of pure and composite cathode materials for solid oxide fuel cells  
AUTHOR(S): Sun, L.; Favreau-Perreault, M.; Brisard, G.  
CORPORATE SOURCE: Departement de Chimie, Universite de Sherbrooke, Sherbrooke, QC, J1K 2R1, Can.  
SOURCE: Journal of New Materials for Electrochemical Systems (2004), 7(4), 247-255  
CODEN: JMESFQ; ISSN: 1480-2422  
PUBLISHER: Journal of New Materials for Electrochemical Systems  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB In this paper, La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub> cathode and Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2-α</sub> electrolyte materials were synthesized by using a glycine-nitrate combustion (GNC) technique whereas La<sub>0.9</sub>Sr<sub>0.1</sub>MnO<sub>3-δ</sub> and La<sub>0.9</sub>Sr<sub>0.1</sub>Mn<sub>0.7</sub>Fe<sub>0.3</sub>O<sub>3-δ</sub> cathode materials were synthesized according to the Pechini method. The structures of all the cathode materials are perovskite type and their particle sizes are around 300 nm (for samples prepared by the GNC technique) and around 150-200 nm (for samples prepared by the Pechini method). Pure La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub>, La<sub>0.9</sub>Sr<sub>0.1</sub>Mn<sub>0.7</sub>Fe<sub>0.3</sub>O<sub>3-δ</sub> and composite La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub>/Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2-α</sub>, La<sub>0.9</sub>Sr<sub>0.1</sub>MnO<sub>3-δ</sub> - 8 mol % yttria stabilized zirconia (LSM/YSZ) cathodes were fabricated by screen printing methods. The morphologies of the cathodes were studied by SEM. The resistances of the cathodes were evaluated by electrochem. impedance spectroscopy and galvanostatic current interruption techniques. Both techniques gave identical results in evaluating the total polarization resistance of the cathodes. Preparing a composite La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub>/Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2-α</sub> cathode at lower temps. is an effective way to improve the electrochem. kinetics of IT-SOFC cathodes. The apparent activation energy of the composite La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub>/Ce<sub>0.8</sub>Gd<sub>0.2</sub>O<sub>2-α</sub> cathode is 41 kJ.mol<sup>-1</sup>, less than that of pure La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3-δ</sub> cathode (51 - 59 kJ.mol<sup>-1</sup>). In addition, the total polarization resistances of composite LSM/YSZ cathodes are about one fifth of those of La<sub>0.9</sub>Sr<sub>0.1</sub>Mn<sub>0.7</sub>Fe<sub>0.3</sub>O<sub>3-δ</sub> cathodes. The total polarization resistances of the composite LSM/YSZ cathodes at 850°C and 800°C are smaller than those of pure LSMF cathodes at 950°C and 900°C, resp.

REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 38 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2004:121100 CAPLUS Full-text  
 DOCUMENT NUMBER: 140:149228  
 TITLE: Perovskite-based fuel cell electrode and membrane  
 INVENTOR(S): Irvine, John Thomas Sirr; Tao, Shanwen  
 PATENT ASSIGNEE(S): The University Court of the University of St. Andrews,  
 UK  
 SOURCE: PCT Int. Appl., 29 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2004013925	A1	20040212	WO 2003-GB3344	20030731
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CA 2493029	A1	20040212	CA 2003-2493029	20030731
AU 2003248994	A1	20040223	AU 2003-248994	20030731
EP 1532710	A1	20050525	EP 2003-766465	20030731
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
JP 2005535084	T	20051117	JP 2004-525554	20030731
US 20050266297	A1	20051201	US 2005-523093	20050201
PRIORITY APPLN. INFO.:			GB 2002-17794	A 20020801
			WO 2003-GB3344	W 20030731

AB The present invention provides a material suitable for use in a solid oxide fuel cell, wherein the material is of an, optionally doped, double perovskite oxide material having the general formula (I):  $(\text{Ln}_a\text{X}_b)_e(\text{Zl}_c\text{Z}_2\text{d})_f\text{O}_g$  (I) wherein Ln is selected from Y, La and a lanthanide series element, or a combination of these and X also represents an element occupying the A site of a perovskite oxide and is selected from Sr, Ca and Ba, and Z1 and Z2 represent different elements occupying the B site of a perovskite oxide and are selected from Cr, Mn, Mg and Fe, and wherein a has a value from 0 to 1, preferably, 0.7 to 1.0, b has a value of from 1 to 0, preferably 0.3 to 0, and each of c and d has a value of from 0.25 to 0.75, provided that a+b has a value of 1, and c+d has a value of 1, and wherein e has a value of from 0.8 to 1, wherein f has a value of 0.8 to 1, and g has a value of 2.5 to 3.2. Also provided are SOFCs having an electrode or functional layer of a material or containing a material of the invention, as well as mixed ionic/electronic conducting membranes suitable for use in a syngas reactor or oxygen separator, comprising a layer of a double perovskite material of the invention, and a method of oxidizing a fuel in an SOFC having an anode of a double perovskite material of the invention.

L9 ANSWER 39 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2004:48842 CAPLUS Full-text  
 DOCUMENT NUMBER: 140:166717  
 TITLE: Synthesis and Characterization of  
 (La<sub>0.75</sub>Sr<sub>0.25</sub>)Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3-δ</sub>, a Redox-Stable,

Efficient Perovskite Anode for SOFCs  
 AUTHOR(S): Tao, Shanwen; Irvine, John T. S.  
 CORPORATE SOURCE: School of Chemistry, University of St. Andrews,  
 Scotland, KY16 9ST, UK  
 SOURCE: Journal of the Electrochemical Society (2004), 151(2),  
 A252-A259  
 CODEN: JESOAN; ISSN: 0013-4651  
 PUBLISHER: Electrochemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB Perovskite-related materials,  $(\text{La}_{0.75}\text{Sr}_{0.25})_{1-x}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$  ( $0 \leq x \leq 0.1$ ) (LSCM), were synthesized and examined as potential anode materials for solid oxide fuel cells (SOFCs).  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_3$  exhibits a rhombohedral structure. It appears to be chemical compatible with yttria-stabilized zirconia (YSZ) to  $\geq 1300^\circ$ . At  $900^\circ$  its elec. conductivity is  $\approx 0.38$  S/cm in air and 1.5 S/cm in 5%  $\text{H}_2$  ( $p_{\text{O}_2} \approx 10^{-21}$  atm). Good performance was achieved using LSCM as anode with a polarization resistance 0.9 and  $0.47 \Omega \cdot \text{cm}^2$  in wet 5%  $\text{H}_2/\text{Ar}$  and wet  $\text{H}_2$ , resp. The anode polarization was further reduced to 0.6 and  $0.25 \Omega \cdot \text{cm}^2$  in wet 5%  $\text{H}_2/\text{Ar}$  and wet  $\text{H}_2$  when a thin layer of  $\text{Ce}_{0.8}\text{Gd}_{0.2}\text{O}_{2-\delta}$  (CGO) layer was coated between YSZ and the LSCM anode. Stable performance was sustained for at least 4 h operating in wet methane. By improving the electrode microstructure, the electrode polarization resistance approaches  $0.2 \Omega \cdot \text{cm}^2$  at  $900^\circ$  in 97%  $\text{H}_2/3\%$   $\text{H}_2\text{O}$  for LSCM containing a small amount of YSZ to improve adherence but without CGO. Good performance is achieved for methane without using excess steam. Using ambient humidification (i.e., 3%  $\text{H}_2\text{O}$ ), the same performance is achieved with methane at  $950^\circ$  as for  $\text{H}_2$  at  $850^\circ$ . The anode is stable in both fuel and air conditions and shows stable electrode performance in methane. Thus, both redox stability and operation in low-steam hydrocarbons have been demonstrated, overcoming 2 of the major limitations of the current generation of Ni zirconia cermet SOFC anodes. LSCM and other complex perovskites are promising anode materials for SOFCs.

REFERENCE COUNT: 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 40 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:928076 CAPLUS Full-text  
 DOCUMENT NUMBER: 140:184587  
 TITLE: Smooth connection between separator and cathode using  
 graded structures  
 AUTHOR(S): Takeda, Yasuo; Aihara, Tetsuya; Hirano, Atsushi;  
 Imanishi, Nobuyuki; Yamamoto, Tohru  
 CORPORATE SOURCE: Department of Chemistry, Faculty of Engineering, Mie  
 University, Tsu, 514-8507, Japan  
 SOURCE: Proceedings - Electrochemical Society (2001),  
 2001-16(Solid Oxide Fuel Cells VII), 828-836  
 CODEN: PESODO; ISSN: 0161-6374  
 PUBLISHER: Electrochemical Society  
 DOCUMENT TYPE: Journal  
 LANGUAGE: English

AB To decrease the contact resistance between a  $\text{La}_{0.9}\text{Sr}_{0.1}\text{CrO}_3$  separator and a  $\text{La}_{0.9}\text{Sr}_{0.1}\text{MnO}_3$  cathode, a graded structure was introduced between them. The starting powders were prepared by ultrasonic spray pyrolysis of aqueous solns. By co-firing the laminated  $(\text{La},\text{Sr})\text{Cr}_{1-x}\text{Mn}_x\text{O}_3$  (graded from  $x = 0$  to 1) powder sheets, disks with good connection were formed. The thermal expansion mismatch between the separator and electrodes also decreased.

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 41 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:377215 CAPLUS Full-text  
DOCUMENT NUMBER: 138:356269  
TITLE: Fuel-flexible anodes for solid oxide  
fuel cells  
INVENTOR(S): Barnett, Scott A.; Liu, Jiang; Madsen, Brian  
PATENT ASSIGNEE(S): Northwestern University, USA; Functional Coating  
Technology, LLC  
SOURCE: PCT Int. Appl., 49 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003041196	A1	20030515	WO 2002-US35991	20021107
W: CA, JP, KR				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR				
US 20030124412	A1	20030703	US 2002-291875	20021107
PRIORITY APPLN. INFO.:			US 2001-348067P	P 20011107

AB The invention is about the electrochem. oxidation of hydrogen and/or hydrocarbons in solid oxide fuel cells, to generate good power densities at low operating temps. Performance is obtained using various ceramic anode components, over a range of useful fuels.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 42 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:332691 CAPLUS Full-text  
DOCUMENT NUMBER: 139:103534  
TITLE: Fuel cells: The amazing perovskite anode  
AUTHOR(S): Boukamp, Bernard A.  
CORPORATE SOURCE: Department of Science and Technology, University of  
Twente, 7500 AE, Neth.  
SOURCE: Nature Materials (2003), 2(5), 294-296  
CODEN: NMAACR; ISSN: 1476-1122  
PUBLISHER: Nature Publishing Group  
DOCUMENT TYPE: Journal; General Review  
LANGUAGE: English

AB A short review of current perovskite use in fuel cells, and introducing a new anode material. Solid-oxide fuel cells are on the verge of commercialization. But several engineering problems - including cheaper technol. with a lower operation temperature - have to be solved 1st. A new all-ceramic anode presents a significant step forward. A new nickel-free perovskite anode is introduced, allowing operation at intermediate temps., around 700 °.

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 43 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:332677 CAPLUS Full-text  
DOCUMENT NUMBER: 139:87802  
TITLE: A redox-stable efficient anode for solid-oxide fuel cells  
AUTHOR(S): Tao, Shanwen; Irvine, John T. S.  
CORPORATE SOURCE: School of Chemistry, University of St Andrews, Fife,  
KY16 9ST, UK  
SOURCE: Nature Materials (2003), 2(5), 320-323  
CODEN: NMAACR; ISSN: 1476-1122

PUBLISHER: Nature Publishing Group  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB We report a nickel-free solid oxide fuel cell (SOFC) anode, La<sub>0.75</sub>Sr<sub>0.25</sub>Cr<sub>0.5</sub>Mn<sub>0.5</sub>O<sub>3</sub>, with comparable electrochem. performance to Ni/yttria-stabilized zirconia cermets. The electrode polarization resistance approaches 0.2  $\Omega$ ·cm<sup>2</sup> at 900° in 97% H<sub>2</sub>/3% H<sub>2</sub>O. Very good performance is achieved for methane oxidation without using excess steam. The anode is stable in both fuel and air conditions, and shows stable electrode performance in methane. Thus both redox stability and operation in low-steam hydrocarbons have been demonstrated, overcoming two of the major limitations of the current generation of nickel-zirconia cermet SOFC anodes.

REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 44 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2003:97864 CAPLUS Full-text

DOCUMENT NUMBER: 138:140076

TITLE: Method of fabrication of nanocomposite electrodes for electrochemical system applications

INVENTOR(S): Seabaugh, Matthew M.; Swartz, Scott L.

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 24 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20030027033	A1	20030206	US 2002-185496	20020628
CA 2450679	A1	20021229	CA 2002-2450679	20020628
WO 2004013882	A2	20040212	WO 2002-US20467	20020628
WO 2004013882	A3	20050224		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW			
RW:	GH, GM, KE, LS, MW, MZ, RU, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
AU 2002368052	A1	20040223	AU 2002-368052	20020628
EP 1527486	A2	20050504	EP 2002-807647	20020628
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR			

PRIORITY APPLN. INFO.: US 2001-302159P P 20010629  
WO 2002-US20467 W 20020628

AB A method of making ceramic electrode materials is disclosed comprising intimate mixts. of two or more components, including at least one nanoscale ionically conducting ceramic electrolyte material (e.g., yttrium-stabilized zirconia, gadolinium-doped ceria, samarium-doped ceria, etc.) and at least one powder of an electrode material, which may be an elec. conducting ceramic electrode material (e.g., lanthanum strontium manganite, praseodymium strontium manganese iron oxide, lanthanum strontium ferrite, lanthanum strontium cobalt ferrite, etc.) or a precursor of a metallic electrode material (e.g., nickel oxide, copper oxide, etc.). The invention also

includes anode and cathode coatings and substrates for solid oxide fuel cells prepared by this method.

L9 ANSWER 45 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2001:819784 CAPLUS Full-text

DOCUMENT NUMBER: 136:234577

TITLE: An X-ray powder diffraction study of lanthanum-strontium ferromanganites

AUTHOR(S): Caboche, Gilles; Dufour, Louis-Claude; Morin, Francois

CORPORATE SOURCE: LRRS, Laboratoire de Recherches sur la Reactivite des Solides, UMR 5613 CNRS-Universite de Bourgogne, Dijon, 21078, Fr.

SOURCE: Solid State Ionics (2001), 144(3,4), 211-222

CODEN: SSIOD3; ISSN: 0167-2738

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Various lanthanum-strontium ferromanganites ( $\text{La}_{1-x}\text{Sr}_x$ )( $\text{Mn}_{1-y}\text{Fe}_y$ ) $\text{O}_{3\pm\delta}$  with  $x=0.2, 0.5$  and  $0.7$  and  $y=0.2, 0.5$  and  $0.8$  were prepared by a glycine-nitrate combustion route and conditioned into two different oxygenation states which are likely to be encountered in cathode materials for solid oxide fuel cells (SOFC). Crystal symmetries for both the low and the fully oxygenated states were determined by X-ray diffractometry. Most perovskite compns. crystallized in either cubic or rhombohedral symmetry with the exception of  $\text{La}_{0.5}\text{Sr}_{0.5}\text{Mn}_{0.2}\text{Fe}_{0.8}\text{O}_{3\pm\delta}$ , where a transition from rhombohedral to cubic occurred in going from the full to the low oxygenation state. In addition, two strontium-poor compns.,  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Mn}_{0.5}\text{Fe}_{0.5}\text{O}_{3\pm\delta}$  and  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Mn}_{0.2}\text{Fe}_{0.8}\text{O}_{3\pm\delta}$ , remained diphasic and consisted of a combination of both the rhombohedral and the orthorhombic phases. Changes in unit cell volume were analyzed as a function of chemical composition and oxygenated state.

REFERENCE COUNT: 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 46 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2001:237188 CAPLUS Full-text

DOCUMENT NUMBER: 135:125916

TITLE: Chemical diffusion in perovskite cathodes of solid oxide fuel cells: the Sr doped  $\text{LaMn}_{1-x}\text{M}_x\text{O}_3$  (M:Co, Fe) systems

AUTHOR(S): Badwal, S. P. S.; Jiang, S. P.; Love, J.; Nowotny, J.; Rekas, M.; Vance, E. R.

CORPORATE SOURCE: Manufacturing Science and Technology, CSIRO, Clayton, 3169, Australia

SOURCE: Ceramics International (2001), 27(4), 419-429

CODEN: CINNDH; ISSN: 0272-8842

PUBLISHER: Elsevier Science Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB This paper reports the results of chemical diffusion coefficient measurements for oxygen in  $(\text{La},\text{Sr})(\text{Mn},\text{Co})\text{O}_3$  and  $(\text{La},\text{Sr})(\text{Mn},\text{Fe})\text{O}_3$  using a manometric method 773-1023 K. It was observed that the addition of Fe or Co into  $(\text{La}_{4-x}\text{Sr}_x)\text{MnO}_3$  results in a substantial increase of the chemical diffusion coefficient. In the range 25-100 mol% Co or Fe substitution at B-site in  $(\text{La},\text{Sr})\text{MnO}_3$ , the chemical diffusion coefficient exhibits much lower activation energy than that in  $(\text{La},\text{Sr})\text{MnO}_3$ . The chemical diffusion data in  $(\text{La},\text{Sr})(\text{Mn},\text{Co})\text{O}_3$  and  $(\text{La},\text{Sr})(\text{Mn},\text{Fe})\text{O}_3$  systems determined by the manometric method are generally in

agreement with those determined by electrochem. relaxation methods reported in the literature. A comparison of the chemical diffusion data indicates that the oxygen mobility is lowest in (La,Sr)MnO<sub>3</sub> and highest in (La,Sr)CoO<sub>3</sub>.

REFERENCE COUNT: 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 47 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1998:283371 CAPLUS Full-text  
DOCUMENT NUMBER: 128:310444  
ORIGINAL REFERENCE NO.: 128:61501a,61504a  
TITLE: Thermodynamic studies of some composite cathodes used in SOFC  
AUTHOR(S): Tanasescu, S.; Totir, N. D.; Marchidan, D. I.  
CORPORATE SOURCE: Institute of Physical Chemistry, Splaiul  
Independentei, Bucharest, 77208, Rom.  
SOURCE: Proceedings - Electrochemical Society (1997),  
97-40(Solid Oxide Fuel Cells), 879-887  
CODEN: PESODO; ISSN: 0161-6374  
PUBLISHER: Electrochemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB When searching improved cathode materials for use in solid oxide fuel cells (SOFC), a thorough knowledge of the thermodyn. of the new materials is very important. The solid-oxide electrolyte galvanic cell method was selected to study the thermodyn. properties of some composite materials based on lanthanum strontium ferrite manganite, so that the better accuracy of this technique could be fruitfully exploited. The relative partial molar free energies, enthalpies and entropies of oxygen dissoln. in the perovskite phase, as well as the equilibrium oxygen pressures are. obtained in the temperature range of 1073-1273 K. By solid state coulometric titration, the initial composition of the perovskite phases was altered under controlled conditions. The variation of the thermodyn. properties with the oxygen relative. stoichiometry change is discussed. The results evidence the influence of the iron content on the thermodyn. properties.

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 48 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1998:283200 CAPLUS Full-text  
DOCUMENT NUMBER: 128:324002  
ORIGINAL REFERENCE NO.: 128:64187a  
TITLE: Chemical compatibility of LaFeO<sub>3</sub> based perovskites with yttria stabilized zirconia  
AUTHOR(S): Kindermann, L.; Hilpert, K.  
CORPORATE SOURCE: Institute for Materials in Energy Systems, Research  
Centre Julich, Julich, 52425, Germany  
SOURCE: Proceedings - Electrochemical Society (1997),  
97-40(Solid Oxide Fuel Cells), 773-782  
CODEN: PESODO; ISSN: 0161-6374  
PUBLISHER: Electrochemical Society  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB Perovskites on the basis of LaFeO<sub>3</sub> are of interest as cathode materials for advanced SOFC. Physicochem. compatibilities of 63 compns., (La<sub>0.6</sub>A<sub>0.4</sub>)zFe<sub>0.8</sub>M<sub>0.2</sub>O<sub>3-δ</sub> (A = Sr, Ca; M = Cr, Mn, Co, Ni; z = 0.9, 1.0) and (La<sub>1-x</sub>Sr<sub>x</sub>)zFe<sub>1-y</sub>MnyO<sub>3-δ</sub> (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-yttria (8 mol% Y<sub>2</sub>O<sub>3</sub>) were investigated. Powder mixts. of these perovskites were annealed at 1000°, 1100° and 1400° for time periods up to 3600 h. After quenching, the samples were analyzed by XRD, SEM/EDX and TEM/EDX for identification of the reaction products. High Sr



content on A site leads to the formation of SrZrO<sub>3</sub> whereas La<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> was detected in powder mixts. with high La concentration Samples with Ca on A site and Co or Ni on B site showed the formation of a CaZrO<sub>3</sub> phase while a garnet phase was observed with M = Cr or Mn. In some cases also monoclinic zirconia was found. Some compns. showed no reaction products. They might be possible candidates for use as cathode materials in solid oxide fuel cells.

REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 49 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1997:461272 CAPLUS Full-text

DOCUMENT NUMBER: 127:178747

ORIGINAL REFERENCE NO.: 127:34599a,34602a

TITLE: Chemical compatibility of LaFeO<sub>3</sub>-base perovskite structures at the interface of the electrolyte of a solid oxide fuel cell (SOFC)

AUTHOR(S): Kindermann, L.; Hilpert, K.; Nickel, H.

CORPORATE SOURCE: Institut Werkstoffe Energietechnik, Forschungszentrum Julich G.m.b.H., Juelich, D-52425, Germany

SOURCE: Berichte des Forschungszentrums Juelich (1997), Juel-3382, 1-129 pp.

CODEN: FJBEE5; ISSN: 0366-0885

DOCUMENT TYPE: Report

LANGUAGE: German

AB For reducing the operation temperature of a solid oxide fuel cell from 1000° to 850° the development of a new and advanced cathode material is a necessary demand. The investigation of the chemical stability and compatibility of a new material based on LaFeO<sub>3</sub> was of main interest in the work. In addition the elec. properties and the thermal expansion coefficient of some selected compns. were investigated. Also expts. to determine the oxygen vacancy formation were carried out. Physicochem. compatibilities of different compns., (La<sub>0.6</sub>A<sub>0.4</sub>)<sub>z</sub>Fe<sub>0.8</sub>Mo<sub>0.2</sub>O<sub>3</sub> (A = Sr, Ca; M = Cr, Mn, Co, Ni; z = 0.9, 1.0) and (La<sub>1-x</sub>Sr<sub>x</sub>)<sub>z</sub>Fe<sub>1-y</sub>Mn<sub>y</sub>O<sub>3</sub> (x = 0-0.4; y = 0-1; z = 0.9, 0.95, 1.0), with the solid electrolyte zirconia-yttria (8 mol% Y<sub>2</sub>O<sub>3</sub>) were investigated. Powder mixts. of these perovskites were annealed at 1000°, 1100° and 1400° for time periods up to 3600 h in a high temperature furnace. After quenching, the samples were analyzed by XRD, SEM/EDX and TEM/EDX for identification of the reaction products. Inter-diffusion processes between the perovskite material and the electrolyte lead to the formation of new phases. High Sr content on A site lead to the formation of SrZrO<sub>3</sub> whereas La<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> was detected in powder mixts. with high La concentration Samples with Ca on A site and Co or Ni on B site showed the formation of a CaZrO<sub>3</sub> phase while a garnet phase was observed with M = Cr or Mn. In some cases also monoclinic zirconia was found. Some compns. showed no reaction products. Based on these results it was possible to work out different stability criteria for LaFeO<sub>3</sub> based perovskites. Some suggestions were made concerning an electrolyte with a modified composition as well as different dopants namely Co, Zr or Ir.

L9 ANSWER 50 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1997:391099 CAPLUS Full-text

DOCUMENT NUMBER: 127:83824

ORIGINAL REFERENCE NO.: 127:16037a,16040a

TITLE: The influence of compositional variables on the thermodynamic properties of lanthanum strontium ferrite manganites and lanthanum strontium manganites

AUTHOR(S): Tanasescu, S.; Totir, N. D.; Marchidan, D. I.; Turcanu, A.

CORPORATE SOURCE: Inst. Phys. Chem., Bucharest, 77208, Rom.

SOURCE: Materials Research Bulletin (1997), 32(7), 915-923  
CODEN: MRBUAC; ISSN: 0025-5408  
PUBLISHER: Elsevier  
DOCUMENT TYPE: Journal  
LANGUAGE: English

AB To obtain a better understanding of the stability limits of perovskite phases used in new solid-oxide fuel-cell cathode materials, a study of the thermodyn. properties of some perovskite-type oxides based on lanthanum strontium ferrite manganite and lanthanum strontium manganite was initiated. A solid state electrochem. technique was employed for the determination of thermodyn. quantities. The relative partial molar free energies, enthalpies, and entropies of oxygen dissoln. in the perovskite phase, as well as the partial pressures of oxygen, were obtained in the temperature range of 1073-1273 K. The results show the influence of different compositional variables on the thermodyn. properties.

REFERENCE COUNT: 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 51 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1997:281680 CAPLUS Full-text

DOCUMENT NUMBER: 127:7973

ORIGINAL REFERENCE NO.: 127:1637a,1640a

TITLE: Chemical interactions between La-Sr-Mn-Fe-O-based perovskites and yttria-stabilized zirconia

AUTHOR(S): Kindermann, Lutz; Das, Dasarathi; Bahadur, Dharendra; Weiss, Reinhard; Nickel, Hubertus; Hilpert, Klaus

CORPORATE SOURCE: Res. Cent. Julich (KFA), Inst. Mater. Energy Systems, Julich, 52425, Germany

SOURCE: Journal of the American Ceramic Society (1997), 80(4), 909-914

CODEN: JACTAW; ISSN: 0002-7820

PUBLISHER: American Ceramic Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Orthoferrite-based perovskites are of interest as materials for the cathode in solid oxide fuel cells (SOFCs). Therefore, the chemical compatibility between perovskites of the composition  $(La_{1-x}Sr_x)_{z-1}Fe_{1-y}Mn_yO_{3-\delta}$  ( $0 \leq x \leq 0.3$ ;  $0.2 \leq y \leq 1$ ;  $z=0.90, 0.95, 1.00$ ) and the solid electrolyte zirconia ( $ZrO_2$ ) doped with 8 mol% yttria ( $Y_2O_3$ ) (8YSZ) has been investigated. Powder mixts. of the two materials have been annealed at different temps. The formation of monoclinic  $ZrO_2$  at 1000°C, as well as of  $La_2Zr_2O_7$  and  $SrZrO_3$  at 1400°C, has been determined in some samples. The reactions that are observed are discussed, with respect to the thermodyn. activities, tolerance factor, and oxygen-ion migration energies. Some perovskite compns. seem to be compatible with  $Y_2O_3$ -stabilized  $ZrO_2$  (YSZ), thereby offering the possibility to use orthoferrite-based perovskites in SOFCs with a solid electrolyte made of YSZ.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 52 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1996:691611 CAPLUS Full-text

DOCUMENT NUMBER: 126:34277

ORIGINAL REFERENCE NO.: 126:6873a,6876a

TITLE: Phase segregation in substoichiometric  $(La,Sr)_{0.95}(Fe,Mn)O_3$ , SOFC cathode materials

AUTHOR(S): Zachau-Christiansen, B.; Jacobsen, T.; Skaarup, S.

CORPORATE SOURCE: Department Chemistry, University Denmark, Lyngby, DK-2800, Den.

SOURCE: High Temperature Electrochemistry: Ceramics and Metals, Proceedings of the Risoe International

Symposium on Materials Science, 17th, Roskilde, Den.,  
Sept. 2-6, 1996 (1996), 497-504. Editor(s): Poulsen,  
F. W. Risoe National Laboratory: Roskilde, Den.  
CODEN: 63PAA2

DOCUMENT TYPE: Conference  
LANGUAGE: English

AB The variation of oxygen stoichiometry with oxygen partial pressure is determined for a series of perovskites of the nominal composition:  $(\text{La}_{1-x}\text{Sr}_x)\text{O}_{0.95}\text{Mn}_{1-u}\text{Fe}_u\text{O}_\xi$ , with  $x \leq 0.3$ ,  $u \leq 0.5$ , and  $\xi$  close to 3. The measurements are performed as cyclic voltammetry on an oxygen pumping cell, where the variation of the oxygen partial pressure is generated by the imposed potential. The materials contain either manganese- or iron-oxides as second phases. During cyclic voltammetry these oxides are identified by the correspondence between the oxidation/reduction potentials and the thermodynamical values for the equilibrium oxygen pressure. The relative sensitivity is much greater by this technique, where the impurity is quantified on the background of a minor change of  $y$  in  $(\text{La}_{1-x}\text{Sr}_x)\text{O}_{0.95}\text{Mn}_{1-u}\text{Fe}_u\text{O}_{3+y}$ , than by x-ray diffraction in which the background is the spectrum of the total amount of material.

L9 ANSWER 53 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1996:691572 CAPLUS Full-text

DOCUMENT NUMBER: 126:68031

ORIGINAL REFERENCE NO.: 126:13065a,13068a

TITLE: Electric conductivity of  $\text{La}_{1-x}\text{Sr}_x\text{Fe}_{1-y}\text{Mn}_y\text{O}_3$  materials

AUTHOR(S): Gordes, P.; Christiansen, N.; Poulsen, F. W.; Bouakaz, L.; Thomsen, K.

CORPORATE SOURCE: Research and Development Laboratories, Lyngby, DK-2800, Den.

SOURCE: High Temperature Electrochemistry: Ceramics and Metals, Proceedings of the Risoe International Symposium on Materials Science, 17th, Roskilde, Den., Sept. 2-6, 1996 (1996), 247-252. Editor(s): Poulsen, F. W. Risoe National Laboratory: Roskilde, Den.  
CODEN: 63PAA2

DOCUMENT TYPE: Conference

LANGUAGE: English

AB  $(\text{La}_{1-x}\text{Sr}_x)\text{Fe}_{1-y}\text{Mn}_y\text{O}_3$  perovskite compds. with  $s$  0.9-1.0,  $x$  0- $\leq$  0.4 and  $y$  0.2-0.8 were synthesized by drip pyrolysis. The four-point dc method was used to measure the electronic conductivity as a function of temperature, Sr doping, Fe/Mn and  $(\text{La}+\text{Sr})/(\text{Fe}+\text{Mn})$  ratios. High electronic conductivities of  $\leq 126$  S/cm at  $1000^\circ$  in air were obtained for  $x = 0.30$  and  $y = 0.80$ . The produced perovskite powders are suitable for SOFC cathode materials.

L9 ANSWER 54 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1993:542860 CAPLUS Full-text

DOCUMENT NUMBER: 119:142860

ORIGINAL REFERENCE NO.: 119:25553a,25556a

TITLE: Development of improved cathodes for solid oxide fuel cells: Final report

AUTHOR(S): Anderson, H. U.

CORPORATE SOURCE: Univ. Missouri, Rolla, MO, USA

SOURCE: Report (1991), DOE/MC/26015-2988; Order No. DE91002068, 31 pp. Avail.: NTIS  
From: Energy Res. Abstr. 1992, 17(10), Abstr. No. 28523

DOCUMENT TYPE: Report  
LANGUAGE: English

AB The University of Missouri-Rolla conducted a 17 mo research program on the development and evaluation of improved cathode materials for solid oxide fuel cells. The objectives of this program were: the development of cathode materials of improved stability in reducing environments and the development of cathode materials with improved elec. conductivity Potential candidate materials are: air sinterable (La,Ca)(Cr,Co)O<sub>3</sub> compns. more stable than La<sub>0.8</sub>Sr<sub>0.2</sub>MnO<sub>3</sub> towards reduction The conductivity at 1000° was 30-60 S/cm. Compns. within the (Y,Ca)(Cr,Co,Mn)O<sub>3</sub> system have higher elec. conductivity than La<sub>0.8</sub>Sr<sub>0.2</sub>MnO<sub>3</sub> and preliminary results suggest that their stability towards reduction is superior.

L9 ANSWER 55 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1993:86097 CAPLUS Full-text

DOCUMENT NUMBER: 118:86097

ORIGINAL REFERENCE NO.: 118:15027a,15030a

TITLE: Investigation of strontium-doped lanthanum chromium manganese oxide (La(Cr, Mn)O<sub>3</sub>) for solid oxide fuel cells

AUTHOR(S): Koc, Rasit; Anderson, H. U.

CORPORATE SOURCE: Ceram. Eng. Dep., Univ. Missouri-Rolla, Rolla, MO, 65401, USA

SOURCE: Journal of Materials Science (1992), 27(21), 5837-43  
CODEN: JMTSAS; ISSN: 0022-2461

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The (La, Sr) (Cr, Mn)O<sub>3</sub> system was investigated; sintering of the oxides was done in air at <1500°. Significant improvements in densification were observed with substitution of 50 mol.% Mn for Cr and a d. of 95% theor. was achieved with the substitution of 70 mol.% Mn for Cr in the La(Cr, Mn)O<sub>3</sub> system. Elec. conductivity (d.c.) measurements were made as a function of temperature and O activity. At 1000° and 1 atm O, the elec. conductivity was 2.2-20 S/cm for LaCr<sub>0.8</sub>Mn<sub>0.4</sub>O<sub>3</sub> and La<sub>0.9</sub>Sr<sub>0.1</sub>Mn<sub>0.8</sub>O<sub>3</sub>, resp. All of the compns. showed similar dependence of elec. conductivity on the O activity. Dependence was small at high O activity; as the O activity decreased, a break in elec. conductivity at 10-12 atm and 1000° was observed Sintering and elec. conductivity studies indicate that La<sub>0.9</sub>Sr<sub>0.1</sub>Cr<sub>0.3</sub>Mn<sub>0.7</sub>O<sub>3</sub> is a candidate for solid oxide fuel cell applications.

L9 ANSWER 56 OF 56 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1990:80910 CAPLUS Full-text

DOCUMENT NUMBER: 112:80910

ORIGINAL REFERENCE NO.: 112:13783a,13786a

TITLE: Overview of planar SOFC [solid oxide fuel cell] development at NCL

AUTHOR(S): Dokiya, Masayuki; Sakai, Natsuko; Kawada, Tatsuya; Yokokawa, Harumi; Iwata, Tomoo; Mori, Masashi

CORPORATE SOURCE: Natl. Chem. Lab. Ind., Tsukuba, Japan

SOURCE: Proceedings - Electrochemical Society (1989), 89-11(Proc. Int. Symp. Solid Oxide Fuel Cells, 1st, 1989), 325-36  
CODEN: PESODO; ISSN: 0161-6374

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The status of investigations on solid oxide fuel cells for on-site power (10-100 MW) generation is summarized. New materials (La<sub>1-x</sub>Cax)(Cr<sub>1-y</sub>Cay)O<sub>3</sub> and (La<sub>1-x</sub>Srx)(Mn<sub>1-y</sub>Cry)O<sub>3</sub> were developed for use as separators and cathodes,

resp. These materials made the co-firing fabrication of a planar solid oxide fuel cell feasible. A distributor which has ceramic foam structure was effective to reduce thermal stresses during co-firing. Fragile electrolyte plates can be reinforced by supporting with this distributors of ceramic foam membranes.

=> d his

(FILE 'HOME' ENTERED AT 17:59:07 ON 03 NOV 2008)

FILE 'REGISTRY' ENTERED AT 17:59:37 ON 03 NOV 2008

L1 136 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
L2 18 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
L3 44 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
L4 7 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
L5 95 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND  
L6 4 S (0.01-1/LA OR 0.01-1/Y OR 0.01-1/CE OR 0.01-1/PR OR 0.01-1/ND

FILE 'CAPLUS' ENTERED AT 18:02:50 ON 03 NOV 2008

L7 134 S L1  
L8 102 S L5  
L9 56 S (L7 OR L8) AND (SOLID OXIDE FUEL CELL)  
L10 6 S L2  
L11 24 S L3  
L12 8 S L4  
L13 5 S L6  
L14 5 S (L10 OR L11 OR L12 OR L13) AND (SOLID OXIDE FUEL CELL)

=> d 14 ibib abs 1-5

5 ANSWERS ARE AVAILABLE. SPECIFIED ANSWER NUMBER EXCEEDS ANSWER SET SIZE

The answer numbers requested are not in the answer set.

ENTER ANSWER NUMBER OR RANGE (1):exit

ANSWER NUMBERS NOT CORRECTLY SPECIFIED

Enter an answer number, Example: 10  
several answer numbers, Example: 3,7,10  
a range of answer numbers, Example: 5-10  
or a combination of these. Example: 3,7,9-10,15

ENTER ANSWER NUMBER OR RANGE (1):d 114 ibib abs 1-5

ANSWER NUMBERS NOT CORRECTLY SPECIFIED

Enter an answer number, Example: 10  
several answer numbers, Example: 3,7,10  
a range of answer numbers, Example: 5-10  
or a combination of these. Example: 3,7,9-10,15

ENTER ANSWER NUMBER OR RANGE (1):logoff

ANSWER NUMBERS NOT CORRECTLY SPECIFIED

Enter an answer number, Example: 10  
several answer numbers, Example: 3,7,10  
a range of answer numbers, Example: 5-10  
or a combination of these. Example: 3,7,9-10,15

ENTER ANSWER NUMBER OR RANGE (1):1

L14 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 2008:640137 CAPLUS Full-text

DOCUMENT NUMBER: 149:13738

TITLE: Barrier layers for high-temperature SOFCs

INVENTOR(S): Brandner, Marco; Niewolak, Leszek; Froitzheim, Jan;  
Quadackers, Willem J.; Tietz, Frank; Hoefler, Thomas

PATENT ASSIGNEE(S): Bayerische Motoren Werke AG, Germany;  
 Forschungszentrum Juelich GmbH  
 SOURCE: Ger. Offen., 7pp.  
 CODEN: GWXXBX  
 DOCUMENT TYPE: Patent  
 LANGUAGE: German  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 102006056251	A1	20080529	DE 2006-102006056251	20061127
WO 2008064938	A1	20080605	WO 2007-EP60020	20070921
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				

PRIORITY APPLN. INFO.: DE 2006-102006056251A 20061127

AB A high-temperature fuel cell is presented together with a procedure for its operation. An efficient and long-term stable high-temperature fuel cell using ferritic material was developed. To minimize the interaction between ferritic and Ni components in the SOFC a barrier layer is inserted between the problematic components, for example between the interconnector and the Ni net or between the metal substrate and anode. A barrier layer is used to decrease or prevent the interdiffusion of the critical elements, Fe, Cr and Ni. If such a layer is absent, increased interdiffusion occurs.

REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> logoff

ALL L# QUERIES AND ANSWER SETS ARE DELETED AT LOGOFF

LOGOFF? (Y)/N/HOLD:y

COST IN U.S. DOLLARS	SINCE FILE ENTRY	TOTAL SESSION
FULL ESTIMATED COST	190.51	594.72

DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)	SINCE FILE ENTRY	TOTAL SESSION
CA SUBSCRIBER PRICE	-45.60	-45.60

STN INTERNATIONAL LOGOFF AT 18:12:20 ON 03 NOV 2008